

MODERN Machine Shop

FEBRUARY, 1954

THE

LENOX

FAMILY

CIRCLE

HACK SAW BLADES
Hand and Power Sizes
High Speed Steel.

BAND SAW BLADES
For all Machines
100' Coil Stock - Welded Blades

HOLE SAWS
High Speed Steel
Welded Edge

**GROUND
FLAT STOCK**
Precision Ground

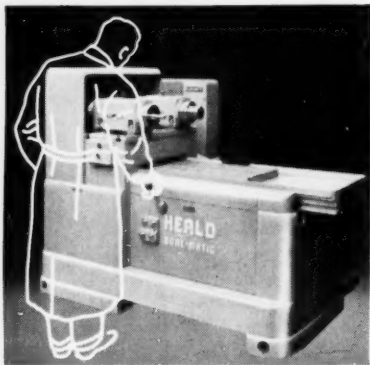
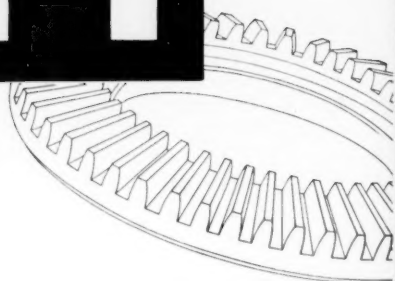
"THE TOOLS IN THE PLAID BOX"

AMERICAN SAW & MFG. COMPANY
SPRINGFIELD, MASS.

HACK SAWS • BAND SAWS • GROUND FLAT STOCK • HOLE SAWS

Heald Internal outproduces older equipment by nearly

2 to 1



This Heald Model 271 Gage-Matic grinds ring gear bores nearly as fast as two older machines.

THIS might be just another case history, except for one thing—a production increase of almost 100 per cent. And that's a pretty important saving in any production man's language.

A Heald Model 271 Gage-Matic was installed by an automotive manufacturer for grinding the bore of differential ring gears. A simple, straightforward operation—yet it was found that this new Internal out-produced *two* older machines by almost two-to-one! Why? Because all of the new Heald machines have been designed to save time and effort on *every phase* of the operating cycle. It all adds up to a substantial increase in production efficiency.

Remember—when it comes to precision finishing, it pays to come to Heald.

Internal and Rotary
Surface Grinding Machines
and Bore-Matics



THE HEALD MACHINE COMPANY
WORCESTER 6, MASSACHUSETTS

Offices in Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York

"A remarkable movie"—CINCINNATI POST

SEE IT NOW

mail card below

FOR THE FIRST TIME, you can see the absorbing story of the vital tool and die industry on film. Produced by the National Tool & Die Manufacturers Association, this full color and sound motion picture will take you inside the nation's tool and die shops. It will show you how their skilled craftsmen create the special tooling that makes possible our mass production system — the system that has converted automobiles and television sets from luxuries to everyday conveniences. You will tour mass production plants to watch high-precision products of the tool shops in action. And you will follow the progress of an actual apprentice tool and die maker through his 8,000-hour course leading to journeyman status. Narration of this fast-moving, 22-minute story is in non-technical terms that can be understood by your son, your wife, your banker, your lawyer. It's excellent for luncheon clubs, PTA's, schools and industrial groups. Arrange now for a free group showing of this authentic film. Fill out card below and mail it *today!*

FREE BOOKLET!

Here's an interesting story on the contract tool and die industry and its contribution to an advancing civilization. Check and mail the card below for your copy of this booklet, "Artisans of Mass Production."

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☐

Please send complete information about arranging for a free showing (I pay only transportation costs) of your 16 mm. film before _____

(specify type of group: plant workers, PTA, etc.)

☐

Please send _____ copies of your free booklet, "Artisans of Mass Production."

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

HERE'S WHAT YOU WILL SEE

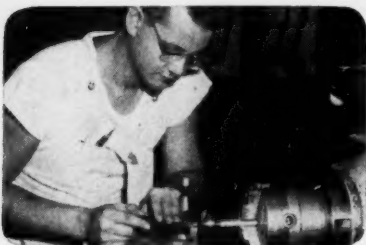
In the film "TOOL AND DIE MAKING—KEYSTONE OF MASS PRODUCTION"



SEE skilled tool and die makers creating the tooling



that makes mass production a reality



SEE this apprentice tool and die maker learning basic machining techniques



to become expert in high-precision operations

*This advertisement published in behalf of the Special Tool and Die Industry
by MODERN MACHINE SHOP magazine*

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NATIONAL TOOL & DIE MANUFACTURERS ASSN.

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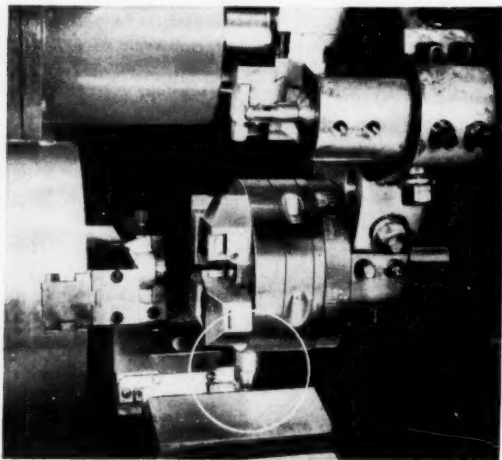
Member

CCA

NBP



Automatic Threading for Automatic Chucking Machines



The adaptability of Landis Heads is again proven by this application of a LANDMATIC Head on a #1AC Warner & Swasey Automatic Chucking Machine.

Normally, the LANDMATIC applied to turret lathes is self-opening and closed manually. To adapt this stationary head for automatic operation on the Automatic Chucking Machine, only two steps were required: (1)—the addition of a closing roller in place of the handle, and (2)—the use of special closing pins which provide overtravel, eliminating the need of a complicated, accurately-set closing cam. This adaptability has paid off for

the S&C Electric Company, Chicago, Illinois, manufacturers of high voltage protective equipment.

In addition, this head through the use of long life tangential chasers offers lower tool cost and less down time. For example—when threading the workpiece shown, a contact ferrule of 85-5-5-5 cast red brass requiring a $1\frac{3}{8}$ "—16 pitch UN thread $\frac{3}{8}$ " long into a $\frac{1}{16}$ " relief, complete runs of over 3,000 pieces are made without grinding the chasers. The 2" Head, shown here, will normally thread all diameters from $\frac{3}{8}$ " to 2", with oversize capacity up to $3\frac{3}{4}$ ". For more information, ask for Bulletin F-90.

385

LANDIS Machine CO. WAYNESBORO
PENNSYLVANIA

**THE costliest
cutting tool
IN YOUR PLANT-**



No—it's not a tool of production—it's a tool of destruction! . . . it is **ABRASIVE GRIT**—by-product of your grinding, cutting and finishing operations.

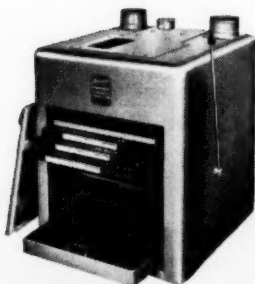
CYCLONE TYPE
for tool and general grinding, polishing, wood-working, plastics, glass, ceramics, etc.



Hammond
DUSKOLECTORS

A MUST FOR DUST!

These units trap dangerous dust before it can harm the health and efficiency of your employees and damage valuable machinery . . . These two distinct types of Duskolectors offer the best and most economical solutions to your special dust problems. Hammond experience will help you too, in eliminating the dust menace . . . Write today for bulletin.



FILTER TYPE
for grinders, drills, lathes, surface grinders, etc.

Hammond
Machinery Builders
INC.

1615 Douglas Avenue

• Kalamazoo, Michigan

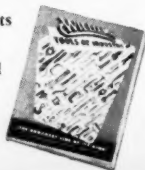
Hammond OF KALAMAZOO GOOD MACHINERY SINCE '22

The RIGHT
tools make
the BIG
difference



WRITE FOR CATALOG 201

detailing the
new improvements
and additions
to the line . . .
or ask your local
distributor.



See someone using a wrench with confidence and ease — getting maximum turning power in the most inaccessible spots — and chances are you'll find he's using a Williams "Superrench".

These wrenches are designed right — drop-forged from selected alloy steel — they're unbelievably strong, light in weight, well balanced. And, there is a wide range of patterns with openings from 3/16" to 3-1/8".

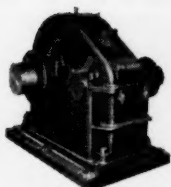
If you have any idea that all wrenches are alike — try a Williams "Superrench" and feel the difference.

WILLIAMS
INDUSTRIAL TOOLS
"The Broadest Line of Its Kind"

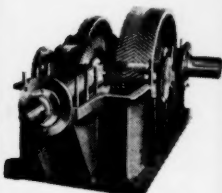


PLUS local service from a Williams Distributor

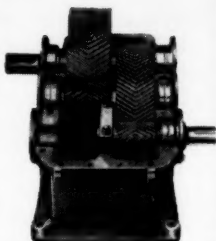
J. H. WILLIAMS & CO. 408 Vulcan Street Buffalo 7, N. Y.



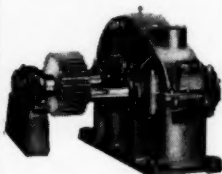
Heavy duty single reduction unit.



Horizontal right angle unit.



Standard double reduction unit.



Unit with pinion on extended shaft.



Close-up of a way of life for Speed Reducers

Long, trouble-free speed reducer life is vitally dependent on precision generation of the gears.

The gears of Farrel® speed reducers are made by the famous Farrel-Sykes method — a process that assures accuracy of tooth spacing, profile and helix angle. The herringbone design provides evenly distributed pressure over each tooth, from tip to working depth line. This means that there is no tendency for the teeth to wear unevenly and thus shorten the life of the gears.

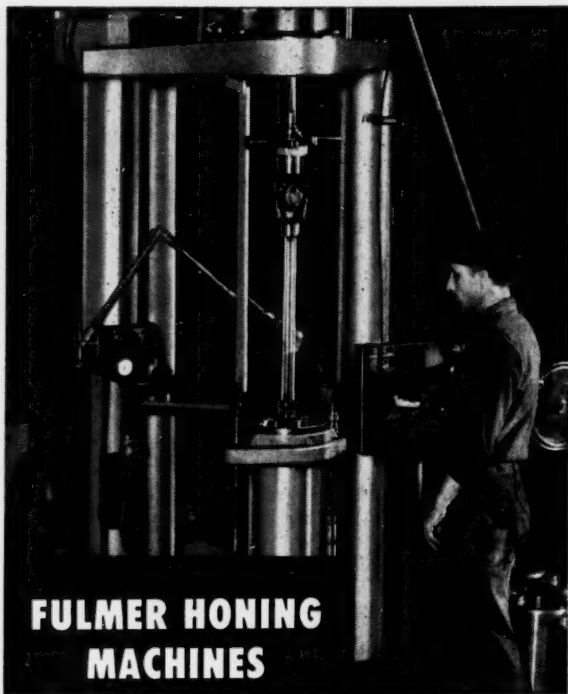
Farrel speed reducers are made in a number of types, with a wide range of ratios and capacities. For further details, send for a copy of bulletin 449.

FARREL-BIRMINGHAM COMPANY, INC. ANSONIA, CONNECTICUT

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Boston, Akron,
Detroit, Chicago, Memphis, Minneapolis, Portland (Oregon),
Los Angeles, Salt Lake City, Tulsa, Houston, New Orleans

FB-860

For Precision Control **OVER *SURFACE FINISHING*** ***OF INTERNAL BORES***



"HIT OR MISS"
methods can
never do . . .

PRECISION is
imperative.

Close tolerances
up to .0001 (\pm)
are achieved
by cutting away
internal bores in
ferrous and non-
ferrous metals,
glass, plastic and
other materials.

Quick . . .
economical . . .
mathematically
accurate.

for cylinder blocks,
connecting rods,
blind end cylinders,
hydraulic cylinders,
4-way valves,
gears, etc.

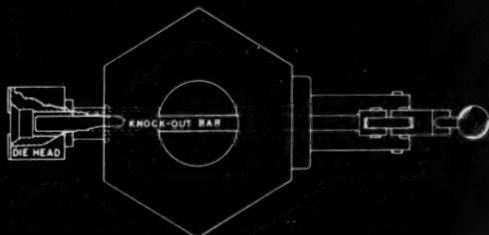
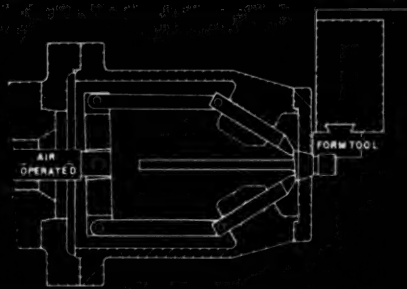
Photo taken in plant of National Supply Co., Toledo, Ohio.

C. ALLEN FULMER CO.

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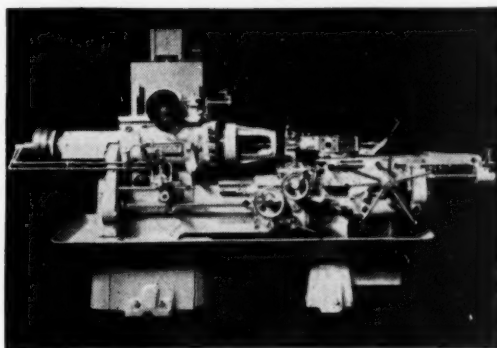


WITH GISHOLT TURRET LATHES

Here's a turbine blade job. It is a tough job to hold because there are a number of different blades, each of different length, and the work must be located and held against a tapered surface. It requires a special fixture. An air-operated plunger through the spindle forces the taper against the locating seat on the fixture, holding all sizes firmly.

The machining is done on the shank end. It must be turned and faced and necked for thread relief. Form tools on the rear of the cross slide handle all this in a single pass. Threading is done from the turret and a hand-operated knock-out bar loosens the blade from the fixture after the threading is completed. Production is more than adequate to meet the contract requirements.

Gisholt Engineers have been specialists in turret lathe work for over 60 years.



Gisholt lathes are ideal for high speed work of this kind. With hydraulic spindle control, the Gisholt Speed Selector, and many other automatic features, operating time and effort are reduced to a minimum. Ask for literature.

GISHOLT MACHINE COMPANY
MADISON 10, WISCONSIN



THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface finishing and balancing of round and partly round parts. Your problems are welcomed here.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

GIVING THE OPERATOR AN ASSIST AND PRODUCTION A BOOST... WITH AUTOMATIC FEATURES

Goal for low-cost operation of metalworking shops . . . when you increase production, reduce worker fatigue. How this desirable result was attained for a production centertype grinding operation on camshafts is illustrated here—a CINCINNATI 10" x 36" Plain Hydraulic Grinder equipped with automatic features.

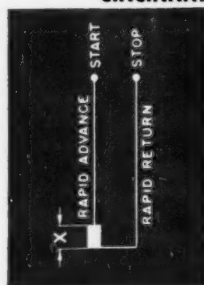
¶First, there's the *automatic infeed attachment*, for infeed grinding operations. It reduces fatigue and aids production by doing several things for the operator: rapid advance wheel to work, grind, spark-out to size, rapid retract wheelhead. Secondly, the *hydraulic footstock* advances and retracts the work center automatically, relieving the operator of this onerous chore twice for each part ground. *Automatic grinding wheel spindle reciprocating attachment* improves finish on the work without undue operator attention. ¶Of course, standard CINCINNATI Plain Hydraulic Grinders are the essence of easy operation. Controls are grouped for maximum convenience; headstock and coolant automatically start and stop with the table or cross feed trav-

erse; the grinding wheel spindle bearings—CINCINNATI's exclusive FILMATIC type—run for years without adjustment. ¶For new production requirements or replacing old equipment, you can't beat a CINCINNATI. You will find brief data in Sweet's Machine Tool Catalog. Complete information may be obtained by writing for our publication No. G-603.

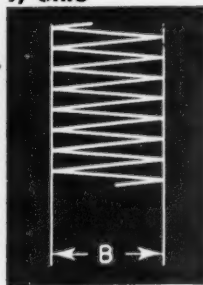
CINCINNATI GRINDERS INCORPORATED

Subsidiary of The Cincinnati Milling Machine Co.

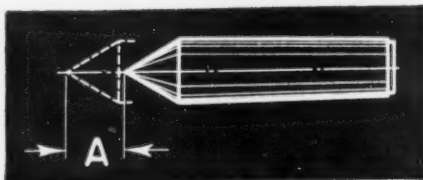
CINCINNATI 9, OHIO



AUTOMATIC INFEEED
X = Stock removal,
adjustable from 0 to
.030".

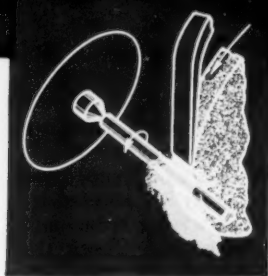
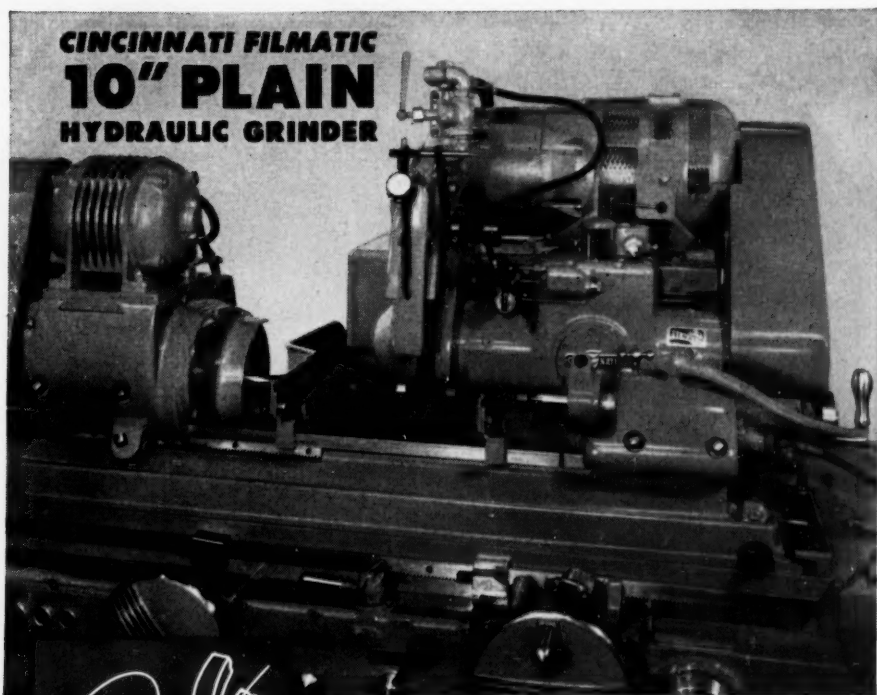


**AUTOMATIC SPINDLE
RECIPROICATION**
B = Stroke, adjustable
from 1/32" to 3/16".

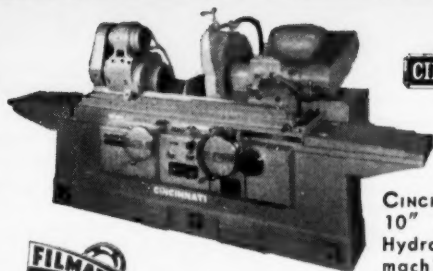
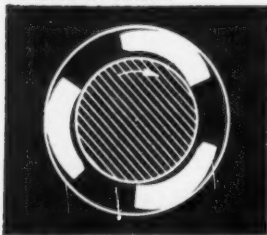


HYDRAULIC FOOTSTOCK A = Automatic
advance and retraction of footstock spindle.

**CINCINNATI FILMATIC
10" PLAIN
HYDRAULIC GRINDER**



**AUTOMATIC COOLANT
AND HEADSTOCK CONTROL**
Work rotation and coolant
automatically start and stop.
Standard feature.



CINCINNATI

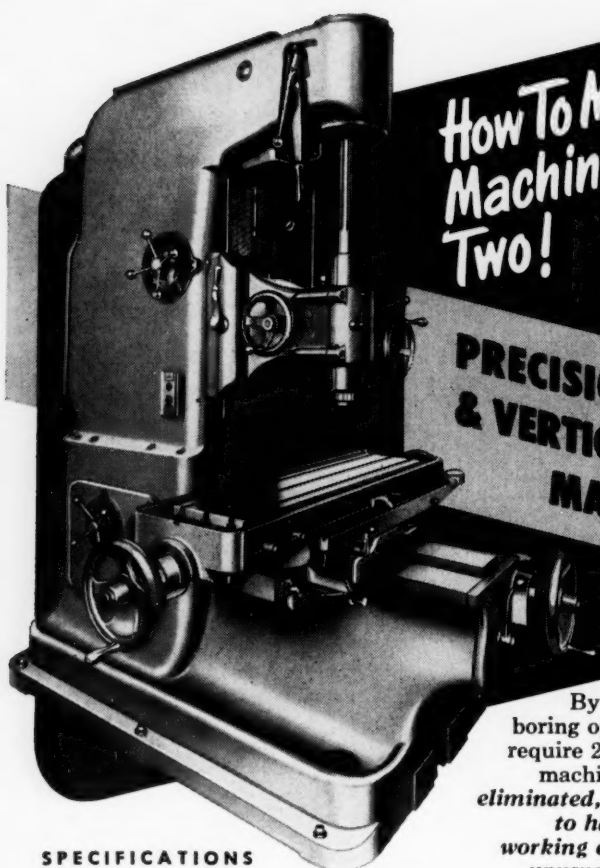
**CINCINNATI FILMATIC
10" x 36" Plain
Hydraulic Grinding
machine, Catalog
No. G-603.**

FILMATIC

CINCINNATI

**FILMATIC GRINDING
WHEEL SPINDLE BEARINGS**
Automatically adjust them-
selves for amount and direc-
tion of load.

**CENTERTYPE GRINDING MACHINES
CENTERLESS GRINDING MACHINES
CENTERLESS LAPPING MACHINES
MICRO-CENTRIC GRINDING MACHINES**



How To Make One
Machine Equal
Two!

KNIGHT'S
NO. 50

**PRECISION BORING
& VERTICAL MILLING
MACHINE**

By doing both milling and boring operation that ordinarily require 2 or more single-purpose machines, *work transfers are eliminated, and setup time is cut to half or less. Exceptional working capacity* is provided by unusual cross table travel and vertical capacity. Check the specifications at left.

Power to handle any job—rugged strength and rigidity—easy and convenient operation—these are only a few of the many other advantages incorporated in the Knight No. 50. Get *all* the details about this remarkable time-saver and profit-maker.

Mail the coupon today.



SPECIFICATIONS

- Table travel—Longitudinal 28", cross 18"
- Vertical capacity—28"
- Table feeds—Dial type, 16
- Table feeds—per minute, 5/16" to 20"
- Table rapid traverse—both directions, 100"
- Spindle speeds, 16—40 to 2000 R.P.M.
- Boring feeds—Infinitely variable, .0000"—.010"
- Horsepower, 7½
- Weight, 8100 Lbs.

ATTACH TO COMPANY LETTERHEAD

W. B. KNIGHT MACHINERY CO.
3922 W. PINE BLVD. • ST. LOUIS 8, MO.

Please send catalog on No. 50 and other Knight Milling machines.

Name.....

Title.....

☐ Send information on Knight 20" and 42" Rotary Tables.

W. B. KNIGHT MACHINERY CO.
3922 W. PINE BLVD. • ST. LOUIS 8, MO.

Continuous Production

**on
these
new
DURO**



MULTI-SPINDLE DRILL PRESSES

Speed, efficiency and output are greatly increased on these new 15½" Duro Multi-Spindle Drill Presses. Designed to satisfy industry's expanding need for faster, cost cutting production units, they enable you to make your own efficient drill press combinations to fit your particular operation. 1, 2, 3, or 4 spindle set-ups give you the advantage of a continuous production line, eliminating costly transferring between machines and provides maximum working surface on long, heavy work. Precision machined, accurate,—they incorporate the most modern features and improvements that make them outstanding in the field.



Write for FREE Brochure

check-full of facts and figures on the complete line of Duro drill presses, detailed construction features, plus available attachments and accessories. The Complete Duro line includes 32 Drill Press models in 3 sizes. Write today!

These features will convince you:

Ball bearings thruout, 0 to ½" chuck capacity, 4¾" spindle travel; 9 splined spindle; improved Jacobs "safe-lock" Chuck which prevents chuck from flying off spindle; simple quill tension adjustment and wear compensating adjustment; rigid 2¾" dia. steel column; double support motor mount; positive depth stop, adjustable depth gauge; built in switches for light and power; plus many other features.

Duro Metal Products Co.

2696 NORTH KILDARE AVENUE
CHICAGO 39, ILLINOIS

WORLD'S LARGEST MANUFACTURERS OF POWER AND HAND TOOLS (DURO-CHROME)

Fairbanks-Morse saves floor space,



In machining electric motor shafts, Fairbanks-Morse uses a Hydra-Trac attachment mounted in place of the compound rest on a Lubicon 16" Heavy-Duty Engine Lathe. This shaft is machined from 3 1/4" 1245 steel bar stock. Rough and finish cuts are run at 218 fpm (average, 32% dpm) with the feed set at .0168 ipr. .012" to .015" surplus stock is left for finish grinding.

slashes tool costs with Hydra-Trace^{*}

LeBlond Lathe plus Hydra-Trace replaces two automatics—
machines 55 different shafts in lots of 25 to 150.

Before Hydra-Trace, F-M produced its motor shafts on a pair of automatic lathes. Each turned one end of the step shafts; each used seven tools and two tool blocks. Frequent set-up changes—each requiring eight hours—more than ate up the time saved by automatic production.

Then Fairbanks-Morse consulted our Chicago office, purchased a 16" Heavy-Duty Engine Lathe equipped with Hydra-Trace. Here are the results:

Set-up time became Production Time. Hydra-Trace setup per shaft end takes only 15 minutes—for a total of 30 minutes. Result—7½ former setup hours became available for production.

Floor space saved. One machine does the work of two. (Overall average production is equal.)

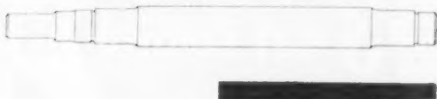
Tool costs slashed. Two tools replace 14. Tool life increased 33%.

Storage problem simplified. Hydra-Trace templates are flat, easily made, much simpler to store and locate than bulky tool blocks (or master shafts).

Hydra-Trace can replace the compound rest of virtually any LeBlond lathe built since 1935. And operators of only average skill can easily operate this heavy-duty, hydraulic tracer.



A typical shaft-turning operation—Hydra-Trace automatically follows template 1 as first-phase rough and finish cuts are taken on one run of shafts.



Then, the shaft ends are reversed. The second template is set and the second machining phase completed.

Whether you are cutting step shafts, contour facing or turning forms—a LeBlond Heavy-Duty Lathe with Hydra-Trace will prove the most versatile, the most dependable machine in your shop. You can use it as a duplicating lathe on production runs; then, in minutes, replace the Hydra-Trace attachment with the standard compound rest for regular work.

For more information on LeBlond Heavy-Duty Lathes, see your nearby LeBlond distributor or write—

THE R. K. LEBLOND MACHINE TOOL CO. CINCINNATI 8, OHIO

Write for Bulletin HT-4E
for the complete Hydra-Trace story.

* Trade mark Reg. U. S. Pat. Off.

turned faster by



WORLD'S LARGEST BUILDER OF A COMPLETE LINE OF LATHES • FOR MORE THAN 64 YEARS



3 way control is "EXTRA" in *Jarvis*

CONTROL 1

is in production—constant improvements in methods and procedures make Jarvis Power Tools the finest that can be produced.

CONTROL 2 is in distribution—Jarvis field men are trained specialists—men who can help you with YOUR problems—men who will give you reliable recommendations.

CONTROL 3 is in service—from start through to delivery, your order receives thorough attention and follow-through.

Use this "3 Way Control" to assure yourself of the best in power tools—JARVIS.

THE CHARLES L. JARVIS CO.
MIDDLETOWN IN CONNECTICUT

TUNGSTEN CARBIDE TOOLS

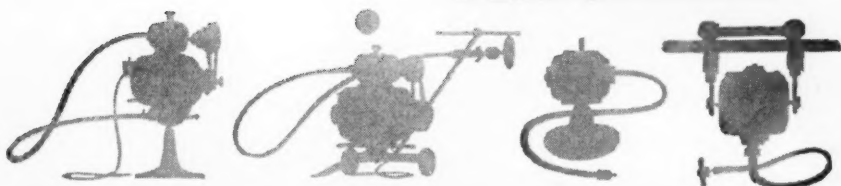
Ground-from-the-solid

Send for **FREE** catalog.

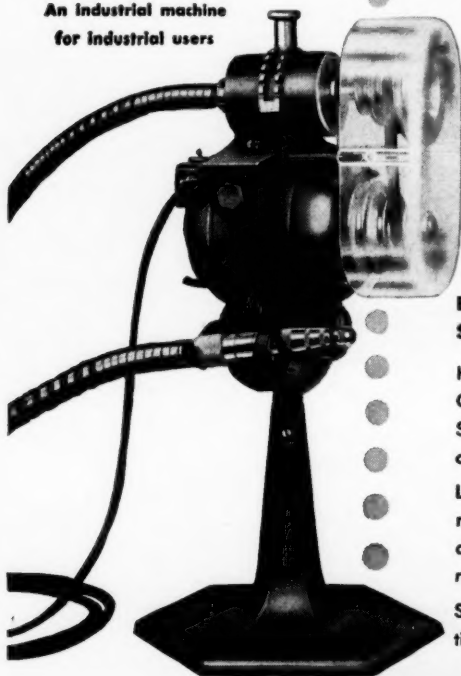
JARVIS POWER TOOLS

TAPPING ATTACHMENTS
TAPS • FLEXIBLE SHAFTS
AND MACHINES • ROTARY
FILES • TUNGSTEN CARBIDE
REAMERS AND MILLS
DRILLS • BORING BITS

VERSATILE PERFORMERS



An industrial machine
for industrial users



Jarvis POWERFUL FLEXIBLE SHAFT MACHINES

BENCH, FLOOR, OR OVERHEAD
SUSPENDED MODELS

Here are truly versatile machines that will do your GRINDING, CUTTING, BUFFING, DISC and DRUM SANDING, WIRE BRUSHING, and ROTARY FILING operations — Faster and More Economically.

Let a Jarvis representative aid in analyzing your needs. This service is available without cost and assures you of getting the *right* machine in the *right* place at the *right* time.

Send for our complete catalog containing illustrations and specifications of various models.

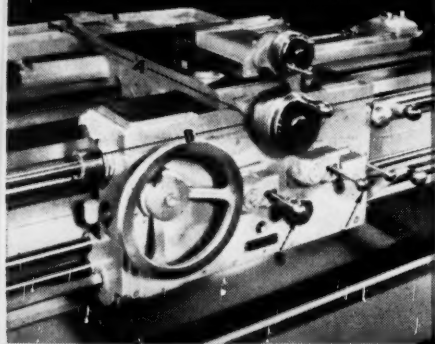
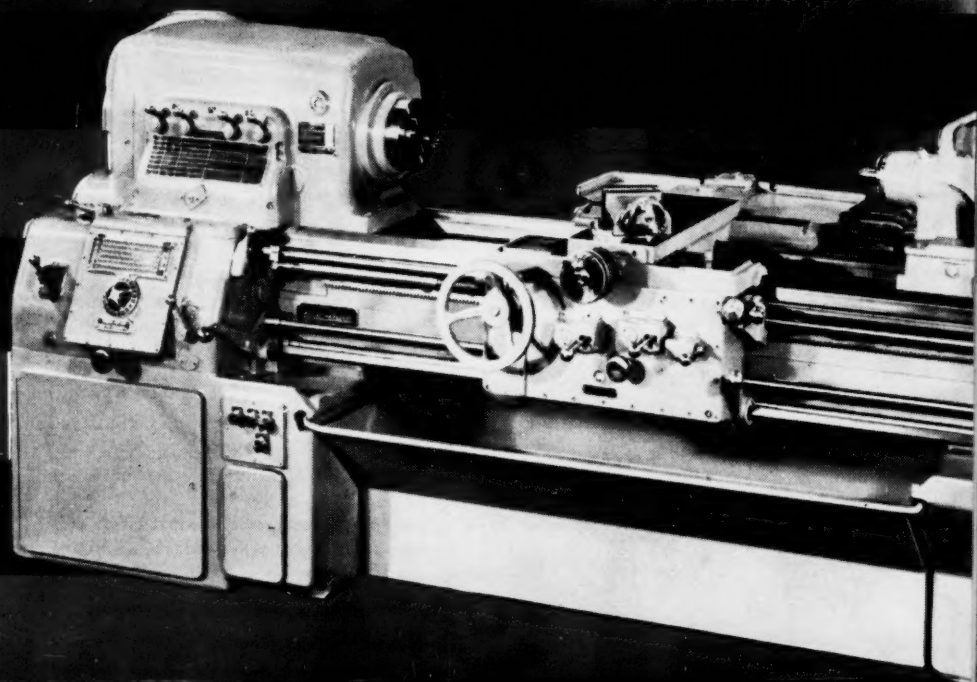
JARVIS POWER TOOLS

TAPPING ATTACHMENTS • TAPS • FLEXIBLE
SHAFTS AND MACHINES • ROTARY FILES •
TUNGSTEN CARBIDE REAMERS • MILLS •
DRILLS • BORING BITS

THE
CHARLES L. JARVIS CO.
MIDDLETOWN IN CONNECTICUT

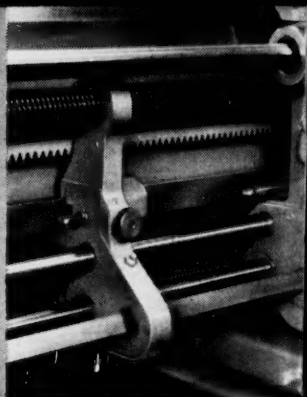
THE NEW MONARCH

SERIES 61

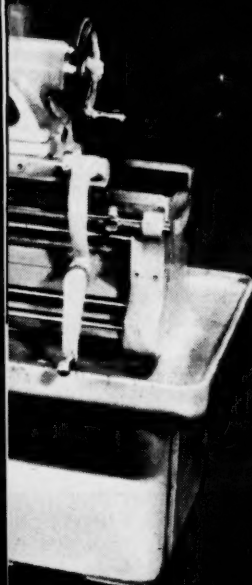


INSTANT, EASY CONTROL

Movement of longitudinal friction lever right or left actuates instant rapid traverse in direction of the movement. Downward motion engages feed. The cross feed friction lever gives similar action to the cross slide. Quick—easy—a great time-saver.



LATHE



BRIGHT IDEAL Long bed Series 61 models boast these unique new traveling rod supports for leadscrew, feed rod, traverse rod and control rod. Without any attention on part of the operator, they're carried along—then re-positioned—as the carriage travels.

► Cuts Tool Adjust Time 50% With Fingertip 4-Way Power Rapid Traverse

Now, Monarch has scored another **FIRST** by putting *all* tool movements under power, right at the apron. Here, at the control center of the machine, the operator spends 90 to 95% of his time. What's more logical than making it easier for him to do a better job at this critical position?

In addition to the Series 61 four-way power rapid traverse, the machine includes such typical Monarch production features as (1) totally enclosed gear box and end gearing, (2) automatic pressure lubrication, (3) anti-friction bearings by the score, (4) ground or shaved helical gears in headstock, (5) American Standard Camlock spindle nose, (6) flame hardened and precision ground integral bed ways and (7) all critical parts made of hardened alloy steel.

The foregoing numbered features are time-proved in the field, having won their spurs on other models of Monarch lathes. They are your guarantee that the Series 61 lathes are unequalled for accuracy, versatility and dependability. Want more information? Write for our complete Series 61 Brochure, No. 1124. *The Monarch Machine Tool Company, Sidney, Ohio.*



FOR A GOOD TURN FASTER—TURN TO MONARCH

FEDERAL

HAS EVERYTHING IN GAGES FOR DIMENSIONAL CONTROL

DIAL INDICATORS AND GAGES

Indicators — over 80 different models, ranges, sizes, graduations, styles — for every accuracy, space, and visibility requirement. Indicating Gages of all types including snap, hole, depth, caliper, etc., and special.

PICTURE PANEL GAGES

Multiple dimensions inspected simultaneously and quickly. (1) a single or individual light indicates at a glance if one or more dimensions are wrong. Or (2) separate lights identify incorrect dimensions and Dial Indicators show how much.

AIR GAGES

Federal Dimensionair: Greatest measuring range of any air gage — .003" with 2500 to 1 magnification. Most modern air gage. Available in various applications and combinations with Electrical and Electronic gages. Send for new complete catalog.

AUTOMATIC SORTING GAGES

Invaluable for selective assembly methods of production. Parts are measured and sorted into any number of dimensional categories with great accuracy and speed. 100% inspection without any possibility of human error. Semi-automatic or hand fed.

MACHINE CONTROL GAGES

Machine tool operations automatically and consistently size controlled — with exceptional accuracy. Also bare wire, insulated wire, glass tubing, steel rods, sheet, and similar continuous material is not only gaged in process but size-controlled by automatically adjusting the machine to compensate for variations out of tolerance.

ENGINEERING GAGE SERVICE

Federal can process engineer, design, and build complete sets of gages for any production job: Can often save money for you by modifying stock gages. Consult Federal before you process your next job. Save time and money and get better gages.

Call us in on the job when you start planning your gage requirements. You may find we've got some good ideas. Federal Products Corporation, 1142 Eddy Street, Providence 1, Rhode Island.



Faster ANGULAR SET-UPS WITH GAUGE BLOCK ACCURACY **MAGNA-SINE**

○N angular set-ups the Magna-Sine saves hours of set-up time, provides positive accuracy, holds work securely without distortion.

The Magna-Sine is a quality permanent-magnet chuck mounted on precision hardened and lapped hinged plates. A Table of Constants provided, quickly shows the standard gauge blocks to insert between the plates for any angle—single or compound. Set-ups to gauge block accuracy take minutes, not hours! When closed, the Magna-Sine is used as a conventional magnetic chuck. Thousands are in daily use.

*Write for your free copy of the Magna-Sine Catalog
which shows all styles and sizes . . . price list is included.*

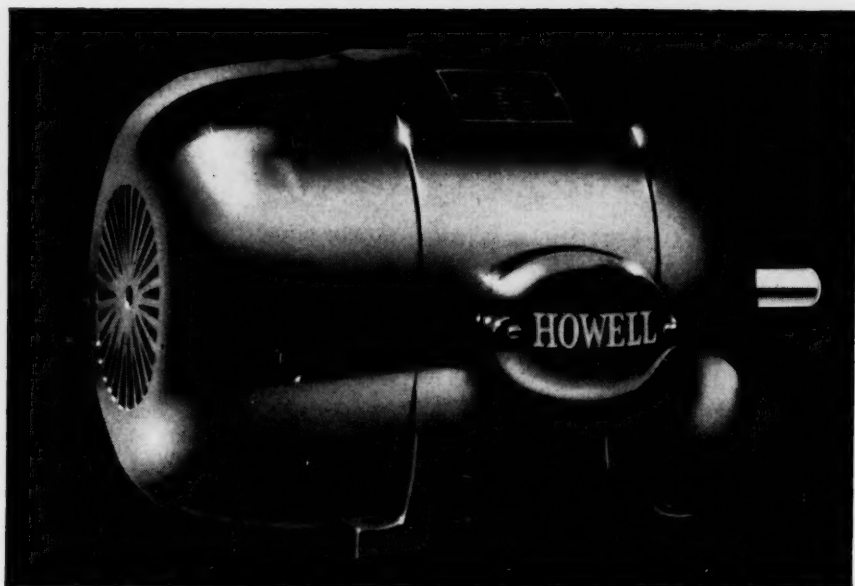
OMER E. *Robbins* COMPANY

Dept. B-1, 5722 TWELFTH STREET • DETROIT 8, MICHIGAN

Also producers of special gauges and fixtures



for
GRINDING
INSPECTION
DRILLING
BORING
AT
ANY
ANGLE



HOWELL FAN-COOLED MOTORS

Totally enclosed, protected against dust, fumes and moisture—the best looking motors your money can buy!

Howell Type K Motors outperform and outlast any open-type motor. Totally enclosed, all working parts are protected against the destructive action of dust, dirt, fumes and moisture. The fan-cooling prevents motor overheating.

The all-steel, streamlined housing conforms to modern design trends

for machine-tools and factory layout.

Howell Type K Motors are available in all electrical types, from 1½ to 300 hp. at 1800 rpm., with vertical or horizontal mounting.

For more complete information on Howell's Type K Motors, contact the Howell man in your area, or write the factory for Bulletin K-2.



HOWELL MOTORS

HOWELL ELECTRIC MOTORS COMPANY, HOWELL, MICHIGAN

PRECISION-BUILT MOTORS FOR INDUSTRY SINCE 1915



Stops tarnish on copper alloy jobs...

● Sciaky Brothers, Inc., Chicago manufacturers of spot welding equipment, were having trouble obtaining a suitable finish on certain copper alloy parts. After they were machined, parts frequently had to be processed to remove stain or tarnish.

Upon the advice of a Standard Oil cutting oil specialist, officials of this company put a STANICUT Cutting Oil to work on the troublesome copper alloy machining jobs. It was the end for tarnish troubles. On a wide variety of operations employing many different copper alloys, STANICUT has provided

STANICUT
TRADE MARK
Cutting Oil

both superior finish and excellent tool life. Of further importance to this company, STANICUT is now used for all operations requiring a cutting oil. This has eliminated the cost and trouble of stocking and using several different cutting oils.

Standard Oil has a metalworking service that is unique in the Midwest. It gives you the metalworking products, the engineering service, and the supply service that fit your needs. You can reach the cutting oil specialist serving your area of the Midwest by phoning your local Standard Oil office.

STANDARD OIL COMPANY
(Indiana)



**The only way to meet 1954
production needs is on
1954 MACHINES**

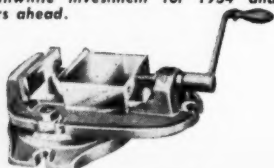
Bridgeport

**TURRET MILLING MACHINES
provide for all
TODAY'S REQUIREMENTS**

Production problems of all kinds are being met and solved through the speed, low cost, accuracy and convenience of "BRIDGEPORTS". These machines offer the exclusive feature of being able to mill, drill, bore and shape, combined with ability to position the milling head at all angles over a wide area, without changing set up.

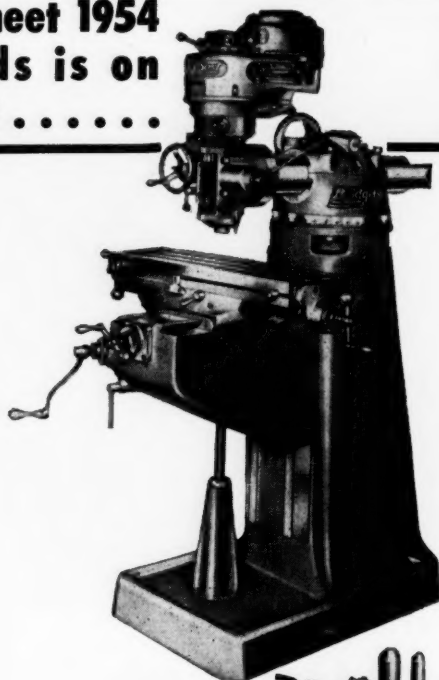
The year just passed has seen more than 2500 Bridgeport Milling Machines shipped to shops interested in making worthwhile improvement in their production. These shops appreciate the value of modernization made possible through the use of machines which in many respects are way ahead of their time in performance and end results . . . machines but are not only "1954 machine tools" but which will still be modern for many years to come.

Ask your dealer . . . or us . . . to show you how you can make the "BRIDGEPORT" a worthwhile investment for 1954 and for years ahead.



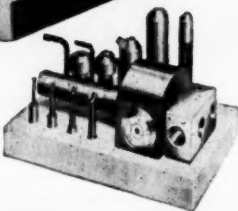
MILLING MACHINE VISE

This improved vise provides greater gripping power, is streamlined for appearance, has a large diameter screw for rigid holding and a coolant trough. Made in two sizes: 5" x 3 1/2" and 6" x 5" jaw openings.



No. 2 BORING HEAD

Boring Tools and Holder provide the means for boring holes up to 6" diameter. Available for use on Bridgeport 1 HP Milling, Drilling and Boring Attachment.



RIGHT ANGLE ATTACHMENTS

Left: Heavy Duty . . . for milling and drilling at right angles. Available for both Master and 1 HP Bridgeport Heads.

Right: Light Duty . . . for right angle milling and drilling narrow, deep molds and cavities.



***Bridgeport* MACHINES, INC.**

Bridgeport, Connecticut

Manufacturers of High Speed Milling Attachments and Turret Milling Machines

"MARVEL" HAS always had the edge



MARVEL High-Speed-Edge Blades assure Faster, more Accurate cutting with proven Economy and complete Safety. Only the MARVEL is a composite blade with a high speed steel cutting edge electrically welded to an exceptionally tough, strong alloy steel body.

The High-Speed-Edge does the cutting while the alloy back with hardened eyes, carries the load. Blade tensions up to 300% higher than those possible with ordinary blades are recommended. This greater tension is confined to the cutting or leading edge by the location of pin holes (exclusive MARVEL design feature) and cannot be overcome by work resistance. Heavier feeds and greater speeds are practical without "run out."

With greater accuracy, higher production and lower cost per cut, come the extra dividend of Safety, for MARVEL High-Speed-Edge Hack Saw Blades are Positively Unbreakable—they will not shatter.

Ask your local MARVEL distributor (see classified phone book) to help you modernize your metal sawing with MARVEL High-Speed-Edge Blades. They cost no more than ordinary high speed steel blades.

1. High Speed Steel cutting edge.

2. Tough unbreakable alloy steel body with hardened eyes.

1. & 2. Integrally welded to make a fast-cutting, long lasting composite blade that is positively unbreakable.

ARMSTRONG-BLUM MFG. COMPANY

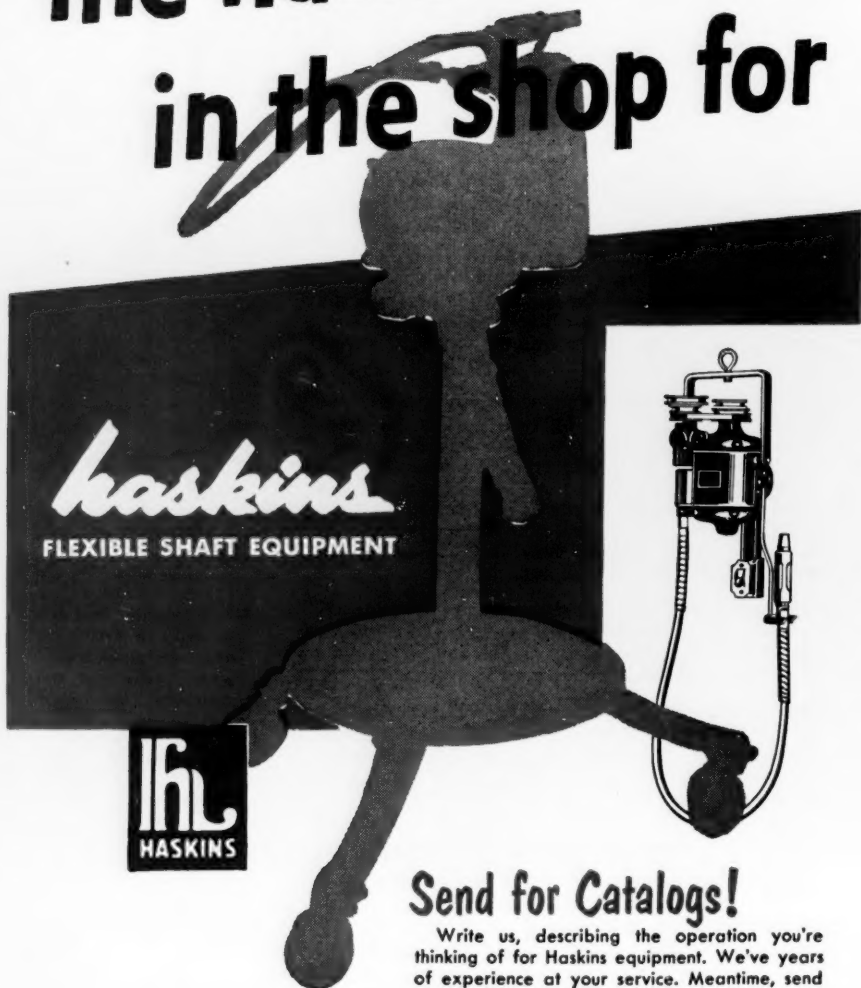
"The Hack Saw People"

5700 BLOOMINGDALE AVENUE

CHICAGO 39, ILLINOIS



the handiest tool in the shop for



Send for Catalogs!

Write us, describing the operation you're thinking of for Haskins equipment. We've years of experience at your service. Meantime, send for complete Catalog.

wire brushing

deburring

polishing

sanding

→ filing

grinding

buffing



weld-blending

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ش

R. G. HASKINS COMPANY

2647 West Harrison St., Chicago, Ill.

Send Catalog of Haskins equipment for working on (state type of work):

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Firm Name _____

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35% SAVINGS IN LABOR

REPLACES 6 OLDER MACHINES

PAYS FOR ITSELF IN 9 MONTHS

Another typical

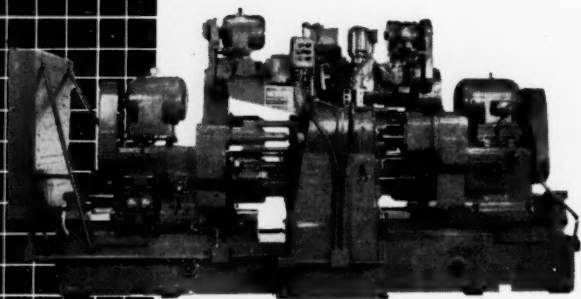
Morris

MOR-SPEED
production machine
performance record

The two way horizontal, eight station, automatic indexing machine illustrated drills, reams, countersinks, forms radius and taps 187 refrigeration unit cylinders per hour.

This unit is equipped with nineteen drilling spindles, fourteen countersinking spindles, four counterboring spindles, one reaming spindle and eleven tapping spindles. Twenty spindles are in the left hand head and eighteen in right hand head.

If your work requires numerous operations on a mass production basis, consult us. Our engineers are eager to serve you.



OPERATIONS PERFORMED:

Drill, countersink and tap 8,— $\frac{1}{4}$ "—28 tap holes

Drill, ream and chamfer both ends of $1\frac{1}{4}$ " hole

Counterbore for $\frac{3}{8}$ " dia. segment

Drill, countersink and tap $1-\frac{3}{8}$ tap hole

Drill, countersink and tap $2-\frac{3}{8}$ —24 tap holes

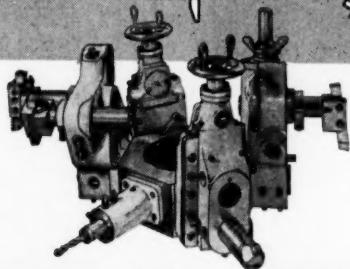
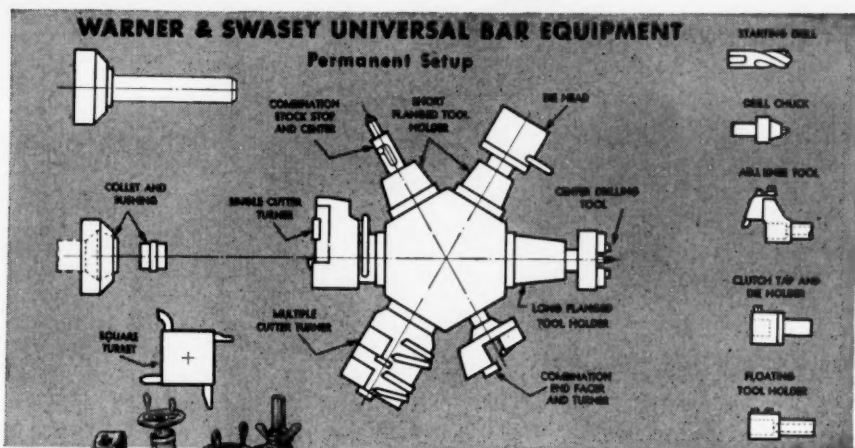
*Refrigeration Unit Cylinder



Morris

THE MORRIS MACHINE TOOL CO.
934 Harriet St., Cincinnati 3, Ohio

a better product at less cost with precision plus production



Use Warner & Swasey
Standard Tools to

SPEED UP—SIMPLIFY YOUR PRODUCTION

YES, you can make Warner & Swasey standard turret lathe tools and Universal Tooling Setups *pay off*—with increased production, less setup, handling and cutting time, longer tool life. This free book clearly and simply explains how to select tools and improve setups, combined and multiple cuts, and many other modern tool applications. Fill in and mail the handy coupon for your free copy—*today!*



YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS
WITH WARNER & SWASEY MACHINE TOOLS,
TEXTILE MACHINERY, CONSTRUCTION MACHINERY

THIS
FREE BOOK
TELLS YOU HOW



2-54

WARNER & SWASEY COMPANY
Department 320-MM, Cleveland 3, Ohio

Please send me my free copy of "Turret Lathe Tools" today!

Name

Company

Position

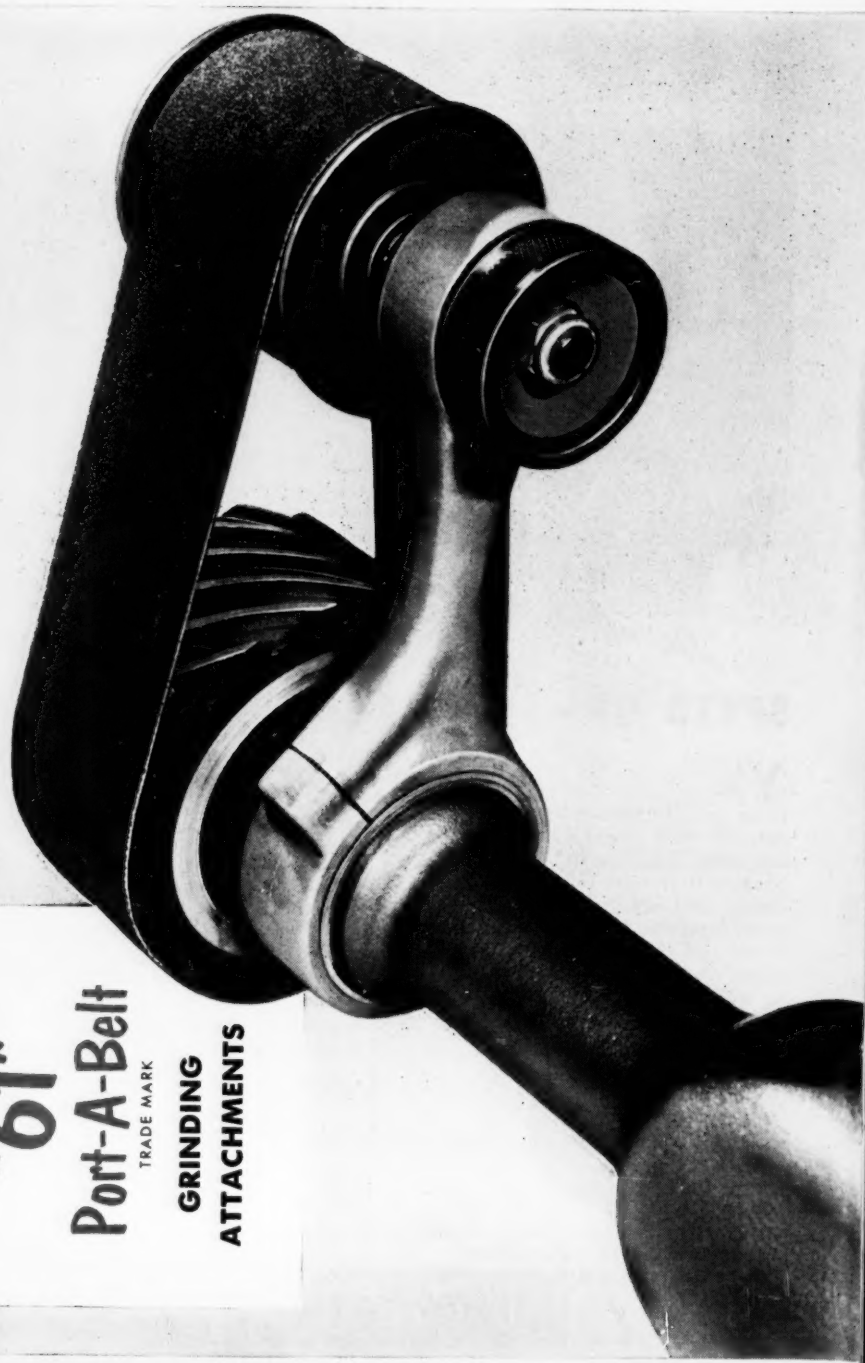
Address

City Zone State

"61"
Port-A-Belt

TRADE MARK

**GRINDING
ATTACHMENTS**



convert your portable tools into fast, efficient BELT GRINDERS

On every straight-spindle tool in your shop, you can "bring the abrasive belt to the work" with sturdy "61" PORT-A-BELT Grinding Attachments by CARBORUNDUM. You get versatility and economy unmatched by any other portable tool—fast, low cost grinding on *any* surface... even the awkward, hard-to-reach areas!

The four PORT-A-BELT attachments easily do contact wheel grinding on flat, convex or concave surfaces—and slack-of-belt grinding on flat, irregular or convex. One operation with PORT-A-BELT often replaces two or three with conven-

tional finishing tools. Saves time, money.

Every PORT-A-BELT unit is equipped with CARBORUNDUM's famous "61" Contact Wheel, with its serrated rubber face. When used with CARBORUNDUM® Brand Abrasive Belts, these contact wheels give you smooth, cool, rapid cutting... without bounce or chatter. Belts last up to twice as long because they don't load up as fast.

PORT-A-BELT Grinding Attachments are precision-made, sturdy enough to take more than normal shop abuse. There's nothing to get out of adjustment!

YOUR CARBORUNDUM DISTRIBUTOR OR SALESMAN will show you how to convert your straight-spindle grinders into fast, efficient belt grinders. He's listed in the yellow pages under "Abrasives." Or, if you prefer, send the coupon.

THE CARBORUNDUM COMPANY
Dept. MM 82-41, Niagara Falls, N. Y.

Yes! Send folder and prices on PORT-A-BELT Grinding Attachments to:

NAME _____

COMPANY _____

STREET AND NO. _____

CITY _____

ZONE _____

STATE _____

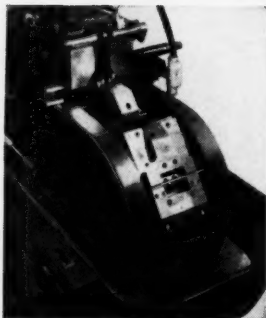
CARBORUNDUM

REGISTERED TRADE MARK

... continually putting more sense in your abrasive dollar!



COST REDUCTION
 thru *faster*
 continuous broaching
 of multiple parts



Holding fixtures are designed for quick, convenient loading, with automatic clamping and unclamping.

● Wherever metal is removed on duplicate small parts you are apt to find a place where Footburt Surface Broaching Machines can cut manufacturing costs. Production is high, and tool maintenance is low in cost per piece. We have had many years of experience in designing the tooling for various types of parts and will gladly advise you in applying surface broaching to your work.

THE FOOTE-BURT COMPANY • Cleveland 8, Ohio
 Detroit Office: General Motors Building

FOOTBURT
M A C H I N E T O O L S

**INCREASES
PRODUCTION...**

LOWERS COSTS...

**PAYS FOR ITSELF
QUICKLY...**

The ROUSE HAND MILLER is a widely used, inexpensive, high speed, ball bearing, motor driven machine for handling light cuts in brass, aluminum, steel, plastics, and other materials—fast, accurately, and at very low cost. Only \$106.00*.

Fixtures (illustrated) extra.

Motor equipment:— $\frac{1}{4}$ H.P. 110 Volt AC 60 cycle, single phase, swivel motor mount and light—\$33.00*

*All prices FOB Chicago.



- ★ **MILLS SMALL PARTS MUCH FASTER.**
- ★ **DRASTICALLY CUTS YOUR INVESTMENT IN EQUIPMENT.** Replaces expensive production machinery—or releases it for other jobs.
- ★ **INEXPERIENCED HELP CAN OPERATE IT.** Safe, simple, fool-proof operation.
- ★ **NO MORE COSTLY SET-UP TIME.** \$106.00* price so low that it pays to keep one or more Hand Millers always set-up for special operations.
- ★ **YOU GET A BETTER PRODUCT**—the result of ABSOLUTE ACCURACY.
- ★ **A LOSS BECOMES A PROFIT** when marginal pieces are finished on the Hand Miller instead of on high cost equipment.
- ★ **VERY LOW MAINTENANCE.**
- ★ **USED REGULARLY IN 1163 MANUFACTURING PLANTS** (some of which use as many as 30 machines)—yet on the market a scant few years.
- ★ **UNIQUE—VERSATILE.** Nothing else like it. One or several machines can be the answer to some of your production problems.

**Write today
for further
information.**

H. B. ROUSE & COMPANY

2214 N. WAYNE AVE., CHICAGO 14
50 YEARS OF SERVICE TO INDUSTRY

ANNOUNCING

A NEW

DUMORE Super-10 Precision Handgrinder



VOLTAGE — 115 AC-DC
CURRENT — 1.4 amps
HORSEPOWER — 1/10
SPEED, no load — 22,000 rpm
DUTY CYCLE — continuous
BEARINGS — ball

WINDING CONNECTION — series
VENTILATION — internal fan
TEMPERATURE RISE — 40° C
FINISH — gray
WEIGHT — 3 lbs., 1 oz. with cord
2 lbs., 10 oz. without cord
LENGTH — incl. chuck 10-1/4"
SMALL DIA. — 1-5/16"
BODY DIA. — 2-7/16"

Here's new speed and better balance for full-shift precision tool and die work

NOW . . . get greater accuracy through better balance with this completely redesigned and improved version of the popular Dumore Series 10 Handgrinder. Powered by a 1/10 hp continuous-duty-rated Dumore Universal motor, the Super-10 assures greater precision with less fatigue . . . provides perfect balance for close tolerance control on fine work. For use with vitrified wheels up to 1" in diameter, the Super-10 is available in three chuck sizes—choose from a 1/8" or 1/4" collet chuck, or a No. 0 Jacobs chuck, 0 to 1/8" capacity.

For complete information, see your Industrial Distributor, or write —

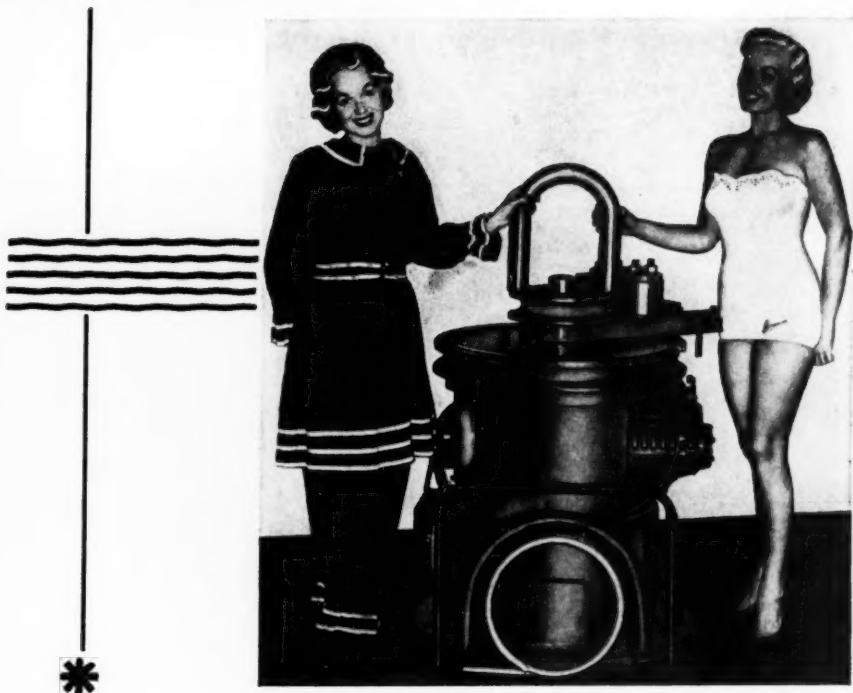


DUMORE PRECISION TOOLS

The Dumore Company

1311 Seventeenth Street, Racine, Wis.

PROGRESS 1893-1954



In 1893, the first PEDRICK BENDER was made. That was during the same era when the costume on the left was in style. Here is the latest PEDRICK PRODUCTION BENDER which is as modern as the costume on the right. PEDRICK PRODUCTION BENDERS are now used for cold bending pipe, tube, reinforced bars, angles and many intricate structural shapes.

PEDRICK PRODUCTION BENDER prices start as low as \$1575.00 for the Model "A-3."

WRITE FOR DESCRIPTIVE FOLDER.

PEDRICK TOOL & MACHINE CO.

3640 N. LAWRENCE ST.

DEPT. 5

PHILADELPHIA 40, PA., U. S. A.

EXCEL No. 6 PAYS BOTH WAYS

**TOOL & CUTTER
GRINDING
HEADQUARTERS
in the smaller shop—**

**EXTRA SHARPENING
SERVICE
in the larger plant—**



*Builders
of Precision
Grinders
for 79
Years*

An outstanding value in price and performance! The Excel No. 6 Universal Cutter and Tool Grinder will accurately sharpen reamers and milling cutters in a wide variety of shapes and sizes. A full line of attachments is available for a multitude of applications including cylindrical and internal grinding. Base optional.

Swings work.....8" dia. x 16" long
Face mill capacity.....12" dia.
Table surface.....4" x 24"

**PROMPT DELIVERY
FOR DEFENSE**

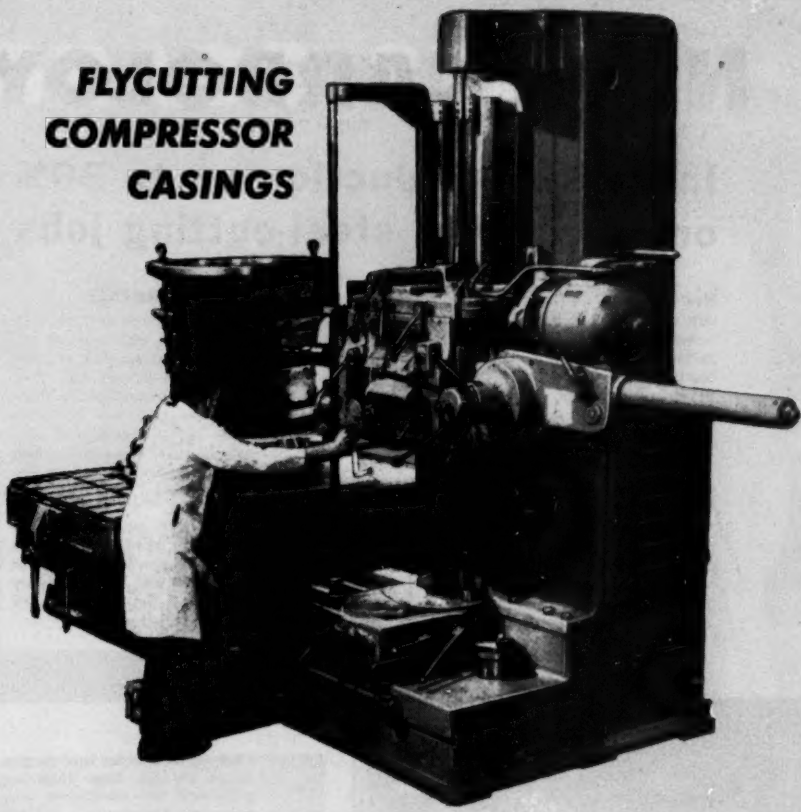
COVEL
**PRECISION
GRINDERS**

BENTON HARBOR — MICHIGAN

DRILL
GRINDERS
CUTTER &
TOOL GRINDERS
HYDRAULIC & HAND
FEED SURFACE GRINDERS

*Write
for
BULLETIN
E-24*

FLY CUTTING COMPRESSOR CASINGS



on the

ORENDA JET ENGINE

at A. V. Roe Canada, Ltd., Malton, Ont.

A total of fourteen Cincinnati Gilbert horizontal boring mills have been installed at A. V. Roe . . . These fast modern machines fit the demand imposed by the Orenda Jet Engine production program: high production and accuracy in the extreme. They are delivering the kind of service that supports the statement: "Those who buy Gilbert buy Gilbert again."

Whatever your boring mill or radial drill requirements may be, you'll be well advised to investigate the productive capacity of Cincinnati Gilbert machines. Our representative is always at your service.



THE CINCINNATI
GILBERT
MACHINE TOOL COMPANY

3366 BEEKMAN STREET • CINCINNATI 13, OHIO

February, 1954

MODERN MACHINE SHOP 33

NEW CARBOLOY

CEMENTED CARBIDE

Increases production up to 30% on heavy-duty steel-cutting jobs

New Grade 370 Carboloy cemented carbide cuts more cubic inches of steel per minute — with longer tool life — than any existing carbide. The first of the new Series 300 cemented carbides, Grade 370 was specially developed for taking heavier cuts in steel at higher speeds than ever before practical.

BUILT-IN TIP RIGIDITY

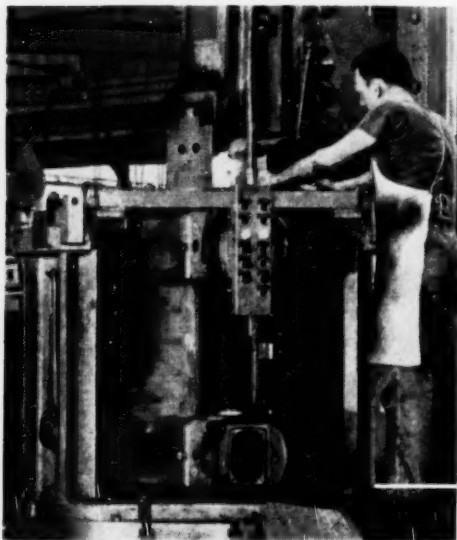
Heavy-duty, high-speed machining builds up great pressures and high temperatures which cause other tools to fail because their cutting edges deform. Grade 370 is made from start to finish by a new, carefully controlled manufacturing process which gives it a built-in structural rigidity to resist this deformation — even at temperatures of around 1800° F.

PROVED PERFORMANCE

Grade 370 has already been proved, both in Carboloy laboratories, and on tough on-the-job customer applications such as rolls, gun barrels, locomotive wheels and other heavy-duty operations. It successfully withstands higher temperatures and pressures of heavy cuts at higher speeds, and lasts longer — longer than any existing carbide. *Production goes up as much as 30%.*

AVAILABLE NOW

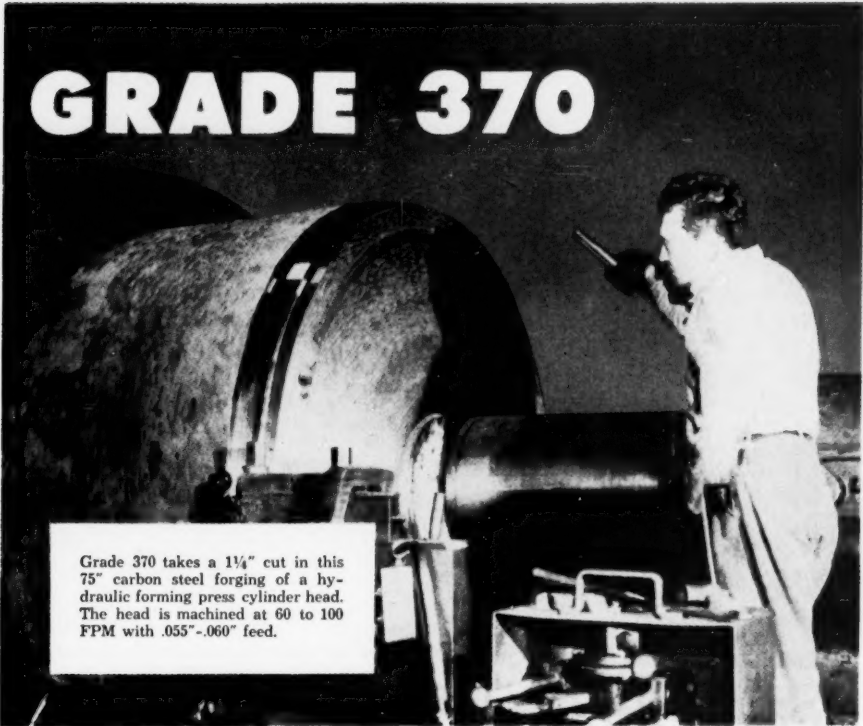
Grade 370 is available immediately in a number of sizes and shapes. Send coupon today for additional information and for free technical literature. The Carboloy Engineering Appraisal Service will work with you on specific applications.



Close-up of cylinder head forging. Grade 370 cuts large chips and withstands the tremendous pressure and temperature without deforming. With Grade 370, both machine downtime and tool cost per cubic inch of steel removed were substantially reduced.

Vertical mill taking $\frac{1}{4}$ " to $\frac{3}{4}$ " cut in an alloy steel casting for a traction motor frame. Grade 370 machined 70 FPM with .060" feed . . . and resulted in a reduction of tool costs of approximately 10 to 1 over other carbides.

GRADE 370



Grade 370 takes a $1\frac{1}{4}$ " cut in this 75" carbon steel forging of a hydraulic forming press cylinder head. The head is machined at 60 to 100 FPM with .055"-.060" feed.



CARBOLOY

DEPARTMENT OF GENERAL ELECTRIC COMPANY

"Carboly" is the trademark for the products of the Carboly Department of General Electric Company

CARBOLOY
Department of General Electric Company
11143 E. 8 Mile Ave., Detroit 32, Michigan

Gentlemen: Rush me, at no cost or obligation, all facts now available on your new Grade 370 Carboly cemented carbide.

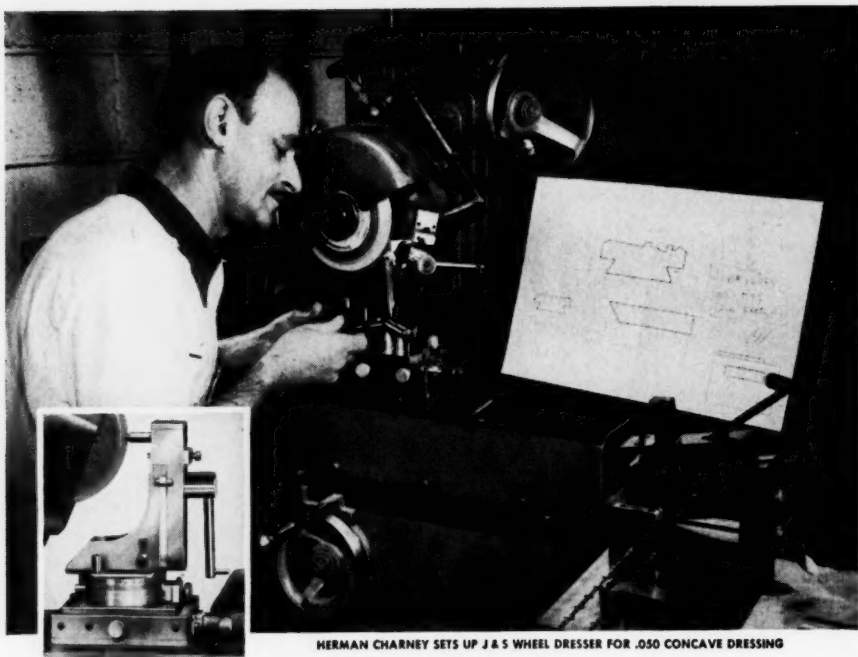
Name

Company

Position

Address

City Zone State



HERMAN CHARNEY SETS UP J & S WHEEL DRESSER FOR .050 CONCAVE DRESSING

Saves hours by setting angles in seconds, radii in minutes

A typical job made easier with a J & S "Fluidmotion" Wheel Dresser

Here's a wheel dressing job which calls for 13 angles, 4 radii, 7 flats. Ordinarily you might expect to spend from 5 to 30 minutes for each setting. With a J & S "Fluidmotion" Wheel Dresser, tool grinder Herman Charney made all 24 settings in just 21 minutes.

Time-saving Features

An unusual case? No — it's typical of the speed and ease of operating a J & S Wheel Dresser. Setting 2 angles with a "Fluidmotion" Dresser, for example, takes only 10 seconds. Setting a radius takes only 2-3 minutes.

Note just how easy it is to operate a J & S Wheel Dresser. All you need is a micrometer and a simple hex wrench. You can forget about gage blocks, height gages and master gage settings. No need to bother either with parallel bars, surface plates or dial indicators.

With the "Fluidmotion" Dresser, you can also dress two angles tangent to a radius in one continuous motion. After dressing the angles, the diamond automatically returns to center.

Accurate to 0.0001"

Accuracy? You can make concave and convex contours at a full 180 degrees with a guaranteed accuracy of 0.0001". J & S dressed forms, too, are always clean and precise. Angles and radii flow into each other, free of tool or chatter marks.

These are some of the benefits you get when you use a J & S "Fluidmotion" Wheel Dresser. A variety of models are available for dressing wheels up to 24" in diameter. Construction in all cases is of high-carbon, high-chrome steels.

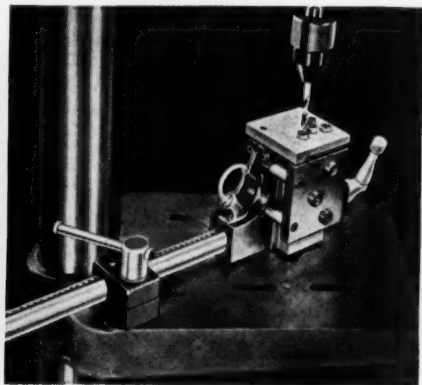
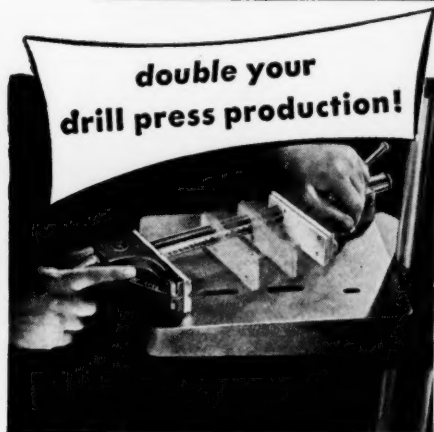
Write for complete information today



WHEEL DRESSERS • JAW CLAMPS • PRECISION VISES • SINE BARS • DOWN-HOLDING DEVICES

645 W. MT. PLEASANT AVENUE, LIVINGSTON, NEW JERSEY

NEW AMF Float-Lock Instant-Change Safety Vise



IDEAL BASE FOR DRILL JIGS

Retaining its full-floating and locking features, but otherwise completely redesigned, the new AMF Float-Lock *Instant-Change* Safety Vise is faster, huskier, greater in capacity (9" and 12" jaw openings)... the most versatile, most economical work holder yet devised for drill presses!

New ratchet-locking jaw slides *instantly* to desired opening. The other, screw-operated jaw positively locks—or completely releases—work with a mere flick (about ¼-turn) of the handle.

Vise turns over readily on three sides, permits extensive drilling without removing work. Horizontal and vertical "V" grooves align and grip rounds for end drilling, centering... ideal for angle drilling. Vise serves as low-cost drill jig when locked anywhere on the table... swings out of the way when not needed. Saves so much set-up time, compared with usual work-holding devices, that good operators should easily be able to double their production!



Contact your local AMF Float-Lock distributor for a demonstration. Or write for his name and address and a copy of new, descriptive Folder WF 53-1(a). Wahlstrom Float-Lock Sales Dept., American Machine & Foundry Company, 511 Fifth Ave., New York 17, N. Y.

MODELS ALSO AVAILABLE FOR BAND SAWS



If WEAR
is a factor...

...use



CARBIDE PLUG GAGES

TUNGSTEN CARBIDE

wire Type .016" to .500" dia.

CHROME CARBIDE

taper insert type .500" to 1.510" dia.

In addition to its regular line of tungsten carbide wire type plug gages from .016" to .500" diameter, The Van Keuren Company now offers a new line of chrome carbide taper insert plug gages in the range from .500" to 1.510" dia. Van Keuren tungsten carbide wire type gages have proved their worth on thousands of tough gaging jobs. The new chrome carbide taper inserts (Carboloy, grade #608*) promise to be equally effective. Wearing qualities of chrome

*Trademark of the Carboloy Dept. of General Electric Co.

carbide are comparable with tungsten carbide. In addition, the material is lighter than tungsten carbide and has a coefficient of expansion close to that of steel . . . both of which factors are a distinct advantage in the larger sizes. **Finish on Van Keuren gages in either tungsten carbide or chrome carbide will average .5 RMS or better.** These gages are available in Class Y, X and XX accuracies at moderate prices and on a reasonable delivery basis.

Send for a copy of the 220-page Van Keuren Catalog and Hand Book No. 35 containing valuable technical and engineering information on measuring problems and methods. Address: The Van Keuren Co., 175 Waltham St., Watertown, Mass.



THE *Van Keuren* CO.,

175 WALTHAM STREET, WATERTOWN, MASS.

Light Wave Equipment • Light Wave Micrometers • Gage Blocks • Taper Insert Plug Gages • Wire Type Plug Gages • Measuring Wires • Thread Measuring Wires • Gear Measuring System • Shop Triangles • Carboloy Cemented Carbide Plug Gages • Carboloy Cemented Carbide Measuring Wires • Chrome Carbide Taper Insert Plug Gages



NEW dresser wears longer cutters change quicker



Longer life—by far—plus quicker, easier-than-ever cutter change are basic improvements in the patented, new type Desmond Huntington dressers. Supplied at no extra cost in No. 1, 2, 21, and 22 sizes. Note the new construction: hardened side washers, press fitted into head, positively secured with slotted hex head bolts and lock washers. Remove one bolt (with wrench or screw driver) to free spindle for quick cutter change.

Ask your Desmond industrial distributor for Bulletin D-48. He can help make your grinding wheels perform better—longer—with proper dressing. Desmond-Stephan Mfg. Co., Urbana, O.



Desmond

THE ONLY COMPLETE LINE OF GRINDING WHEEL DRESSERS AND CUTTERS

with **NEW** **Fosdick BF Spindle**



**change boring tools
repeat hole size**

No more "cut and try" resetting of boring tools every time you change them! With the new BF Spindle you can change tools in seconds with such accuracy that hole sizes are repeated within $\pm .0001"$, *without* resetting. Slash time drastically, whether boring a "one-shot" jig with many different size holes or producing work where repetitive precision is essential.

*Fast tool changing with
Automatic Positioning for
High-Speed, Precision Boring
to a NEW Degree
never before obtainable.*



Drop duplicating bars in place—position work for first hole and bore. Then...

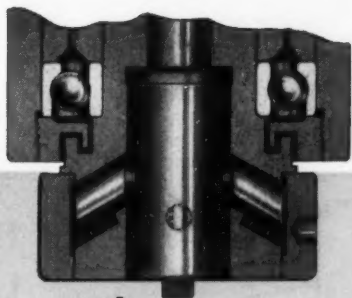


PRESS the button—and in the twinkling of an eye—you're positioned within $\pm .0001"$ for the next operation.

Fosdick builds Automatic Positioning into its Jig Borers to give you $\pm .0001"$ table positioning in seconds simply by pressing a button—even with inexperienced operators. Only two easily-made, easily-stored duplicating bars are needed for each job. Once bars are set, work initially positioned, press button and, in seconds, you're ready for the next operation! This is Fosdick's precision combination—One hole or a thousand, same size or different, you'll hold both position and hole size to $\pm .0001"$!

*For more information write
for these bulletins: Fosdick
Jig Borer... Bulletin 42S
Automatic Positioning
..... Bulletin 42PS
BF Spindle... Bulletin BFS*

in seconds...
to $\pm .0001''$ without resetting



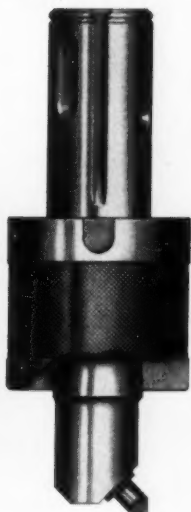
High-precision tool holder is built integral with Jig Borer spindle. Straight-shank tool adapters fit holder precisely — wipe surface clean as tool is inserted, keep dust and dirt from upsetting precision fit. Both adapters and tools "keyed-in" for identical repositioned accuracy.



With the BF Spindle, you can change boring tools while the machine positions. Simply loosen cam ring with spanner wrench. Further hand rotation releases tool.



Then insert new tool, tighten cam ring and you have Fosdick's precision combination—tool changing and work positioning both to $\pm .0001''$ in a matter of seconds!



Need Drilling Equipment? Get a Proposal from Fosdick!



Radial Drills



Jig Bore



Sensitive and Upright Drills



Sensitive Radial Drills



Automatic Positioning Machines

FOSDICK

THE FOSDICK MACHINE TOOL CO., CINCINNATI 23, OHIO

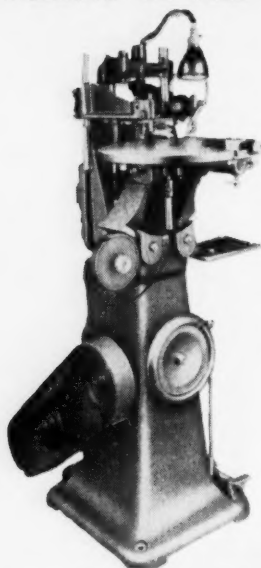
Lower Your Die Costs . . .



**GET
QUICKER and BETTER
FILING, SAWING and
LAPPING with . . .**

Oliver Die Making Machines

PLANTS of ALL SIZES REPORT SAVINGS up to 60%



Oliver Die Making Machines are so simple to operate that skilled labor is not needed. They increase toolroom efficiency . . . cut costs . . . assure precision perfection. Four decades of experience and more than 10,000 installations throughout the world vouch for the superiority and long life of Oliver Die Making Machines.

Start saving money now. Do sawing, filing and lapping the proved way . . . the Oliver way.

OLIVER DIE MAKERS Available in 5 Models

The Bench Model S-1 (illustrated) is a single speed die maker for use on tool steel up to 1" thick.

The Heavy Duty Model (illustrated) has 6 speeds, works in metal up to 3" thick, has variable strokes to 5" with hydraulic feed.

**Write Today For Complete Technical Data on
OLIVER DIE MAKERS**

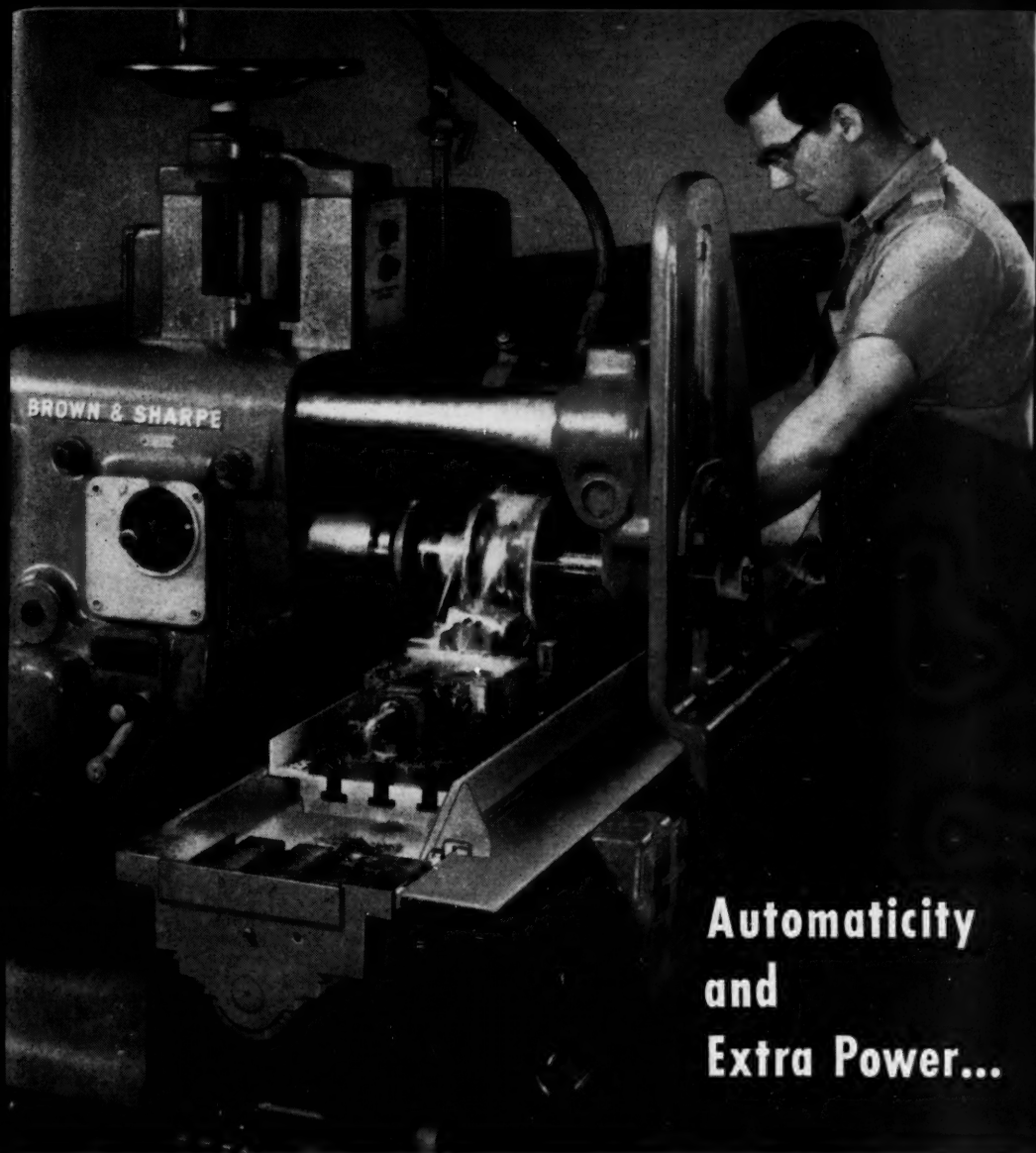
See our catalog in Sweet's Directory

OLIVER INSTRUMENT CO.

1430 E. MAUMEE • ADRIAN, MICHIGAN

MACHINE TOOLS by OLIVER include:

**AUTOMATIC DRILL GRINDERS
TOOL & CUTTER GRINDERS
DRILL POINT THINNERS
TEMPLATE TOOL GRINDERS
FACE MILL GRINDERS
DIE MAKING MACHINES**



**Automaticity
and
Extra Power...**

... the 7½ H.P., electrically-controlled No. 12 Plain Milling Machine.

You get full 7½ H.P. right at the spindle plus "push button" or automatic control of all power movements for rapid production on both long and short run jobs. Dual feed rates, a variety of automatic cycles, and the ability to climb mill in either direction are just a few other time-saving advantages.

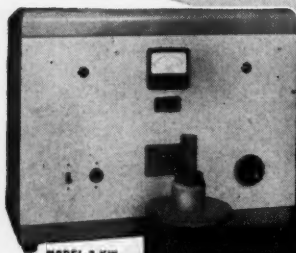
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Brown & Sharpe Mfg. Co.,
Providence 1, R. I., U.S.A.

Brown & Sharpe 

Lepel's 3 new

LOW COST - PORTABLE HIGH FREQUENCY Induction HEATING UNITS



MODEL 2 KW
Spark Gap Converter

\$870.

f.o.b. factory

Ideal for

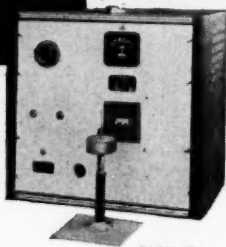
- Production Heating of small parts
- Research Laboratories
- Tool Rooms
- Machine Shops
- Educational Institutions



MODEL T-2 1/2-1
Electronic Tube
Converter

\$1620.

f.o.b. factory



MODEL T-1
Electronic Tube
Converter

\$885.

f.o.b. factory

The Lepel line of induction heating units represents the most advanced thought in the field of electronics as well as the most practical and efficient source of heat yet developed for industrial heating. With a background of half a century of pioneering electrical and metallurgical experience, the name Lepel has become the symbol of induction heating equipment embodying the highest standards of engineering achievement, dependable low cost operation and safety.

Amazing in its speed, Lepel equipment reduces the time required for hardening, annealing, stress relieving, brazing, soldering and melting from minutes to seconds. It performs these operations with a degree of precision and uniformity rarely attained through other processes.

LEPEL Electronic Tube GENERATORS available from 1 kw to 100 kw.

LEPEL Spark Gap CONVERTERS available from 2 kw to 30 kw.

WRITE FOR THE NEW LEPEL CATALOG . . . 36 illustrated pages
packed with valuable information on high frequency induction heating.

<p>BRAZING</p> <p>Permits widest choice of silver or copper brazing alloys from lowest to highest melting points. Ideal for brazing outside tips.</p>	<p>HARDENING</p> <p>Heat localized exactly where wanted at desired temperature. Ideal for gears, cams, bearing surfaces, cutting tools and other areas that are subject to wear.</p>	<p>SOLDERING</p> <p>Speedily and neatly performs intricate soldering applications with or without the use of pre-formed rings.</p>	<p>ANNEALING</p> <p>Ideal for annealing, stress-relieving, normalizing or pre-heating selected areas.</p>	<p>MELTING</p> <p>Readily melts quantities of ferrous and non-ferrous metals in either graphite or ceramic crucibles.</p>
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All Lepel equipment is certified to comply with the requirements of the Federal Communications Commission.



LEPEL HIGH FREQUENCY LABORATORIES, INC.

55th STREET and 37th AVENUE, WOODSIDE 77, NEW YORK CITY, N. Y.

extreme flexibility
makes this new

BECKETT AIR THRUST

DRILLING & TAPPING MACHINE

ideal for small lot production on a wide range of work!

- Single and multiple tapping direct from chuck or any standard drill head without clutch or lead screw. Exact thread reproduction in light metals, plastics and high-strength alloys.
- Controlled air-powered thrust provides correct drilling and tapping action—completely variable and quickly adjustable approach speed, return speed and working thrust.
- Quick change-over from drilling to tapping or allied operations and from light to heavy work.

BECKETT Air Thrust Drilling and Tapping Machine, with electrically controlled "Hi-Cyclic" Air Feed, performs single and multiple tapping without employing a clutch or lead screw. Absolute and precise control of the air thrust at low pressures provides extremely sensitive tapping action. The tap provides its own lead and reproduces a thread with maximum fidelity to the ground tap. A Class 4 fit has been produced in magnesium.

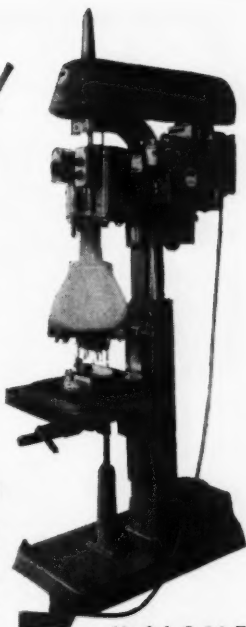
This is a rugged, accurate machine, with heavy base, box column and gibbed ways for sliding head and adjustable work table. Available in models for drilling only and for drilling and tapping. Bench and floor types and table multiple units for continuous line production.

You can triple your drilling and tapping production—at great savings—with the new Beckett Air Thrust Drilling and Tapping Machine. The investment is low—and deliveries are good!

• Write **TODAY** for complete details and Your Copy of **BULLETIN No. 50**

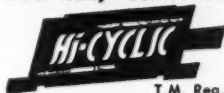
BECKETT-HARCUM COMPANY, INC.

1090 Wayne Road, Wilmington, Ohio



Model C-16-T

Electrically Controlled



T.M. Reg.

Air Thrust

Max. thrust—980 lbs. at 100 p.s.i.
Stroke—4" (6" stroke available)
Capacity—Drill $\frac{3}{4}$ " in steel; tap $1\frac{1}{2}$ " N.C. with $1\frac{1}{2}$ h.p. motor.

For a Boost in Your

METALWORKING Output

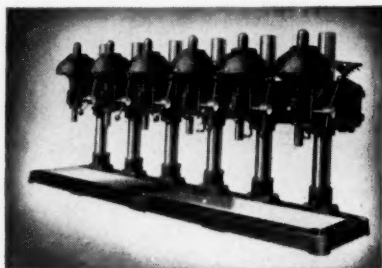
**"Buffalo" NO. 18
DRILLS**



"Buffalo"
No. 18 Pedestal
Model Drill with foot
feed. Operator has both
hands free.

Here are drilling machines your operators can handle with minimum fatigue while setting records in drilling and tapping! All feed controls are easy to reach and handle. All setup adjustments can be made by convenient cranks. Best of all, these rugged production drills have precision-machined spindles running smooth and true on ball bearings for dependable accuracy. And "Buffalo" No. 18 Drills are available in 12 different models to fit into your setup to best advantage. WRITE FOR BULLETIN 3123 FOR THE DETAILS!

NOTE: "Buffalo" also builds a full line of Drills, Shears, Punches, Bending Rolls and Universal Iron Workers to put extra speed and profit into *your* metalworking. Write us about your problem!



"Buffalo" No. 18 Drills are available in as many as 6 spindles for operation with several setups on a production line.

BUFFALO FORGE COMPANY

388 Broadway

Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

Sales Representatives in all Principal Cities

"Buffalo"

DRILLING

•

PUNCHING

•

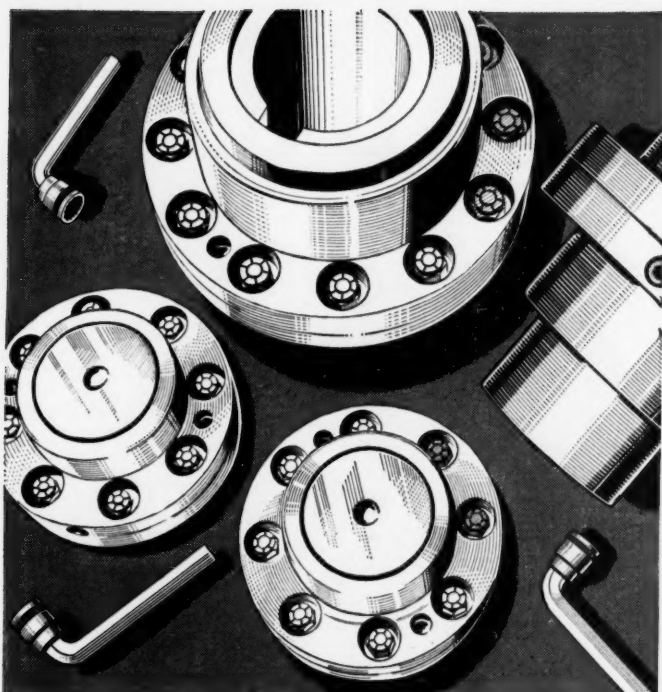
SHEARING

•

CUTTING

•

BENDING



Manufacturers of couplings find that FLEXLOC nuts provide faster assembly and safer, more dependable locking than most other methods.

Here's why more and more original equipment manufacturers specify FLEXLOCs

More and more FLEXLOC Self-Locking Nuts are being used to insure positive fastening of assemblies on original equipment.

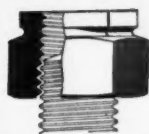
There are many reasons for this. FLEXLOCs reduce production costs. They are easy to install. They are one piece, all metal. They eliminate complicated, time-consuming methods

of locking bolts and studs. They stay put—once their locking threads are fully engaged. They are easy to get—SPS can make prompt delivery of FLEXLOCs in any quantity, and in a wide range of sizes, through a national organization of industrial distributors. Write for literature and samples. STANDARD PRESSED STEEL CO., Jenkintown 22, Pa.

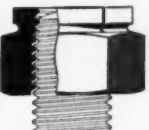
FLEXLOC LOCKNUT DIVISION

SPS

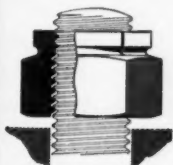
JENKINTOWN PENNSYLVANIA



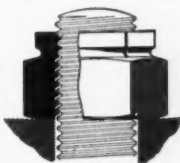
Starting. A FLEXLOC starts like any ordinary nut. Put it on with your fingers. Tighten it with a standard hand or speed wrench.



Beginning to Lock. As the bolt enters the segmented locking section, the section is expanded, and the nut starts to lock.

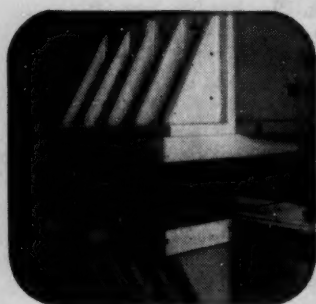


Fully Locked As a Stop Nut. When $1\frac{1}{2}$ threads of a standard bolt are past the top of the nut, the FLEXLOC is fully locked. A FLEXLOC does not have to seat to lock.

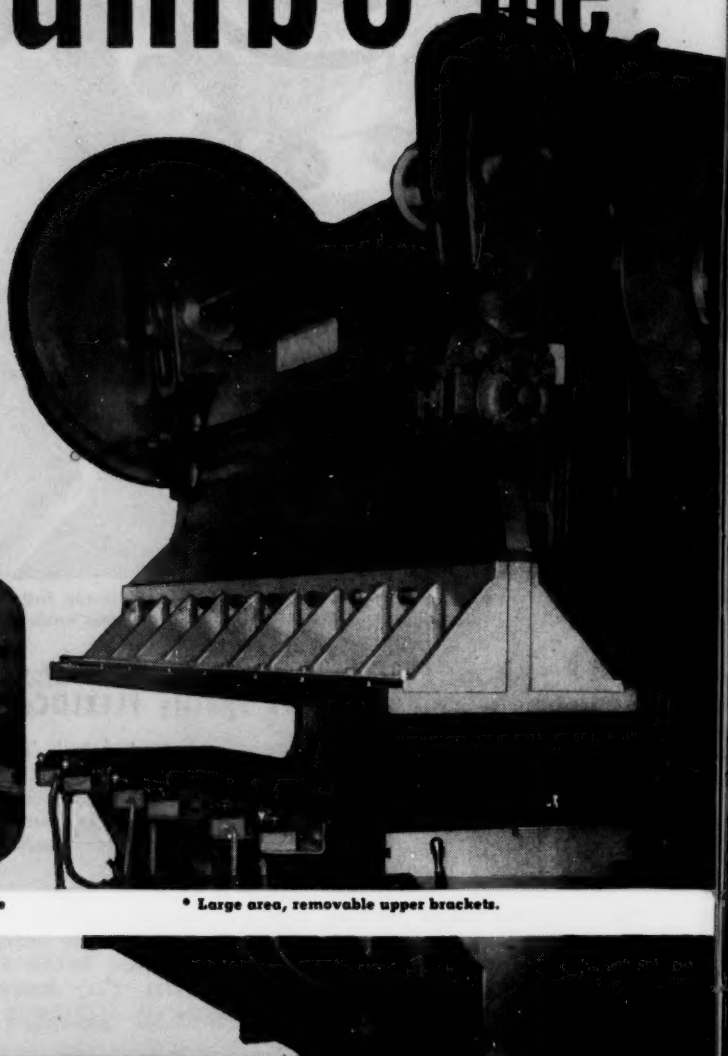


Fully Locked As a Seated Nut. When it is used as a lock or stop nut, the locking threads of the FLEXLOC press inward against the bolt, lifting the nut upward and causing remaining threads to bear against the lower surface of the bolt threads. Vibration will not loosen a FLEXLOC, yet there is no galling of threads.

Jumbo die



• Short, special purpose, removable upper brackets.



• Large area, removable upper brackets.



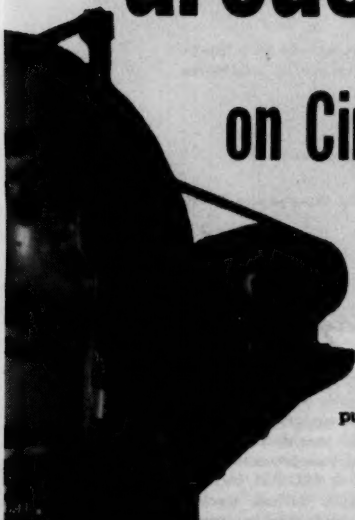
THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A.

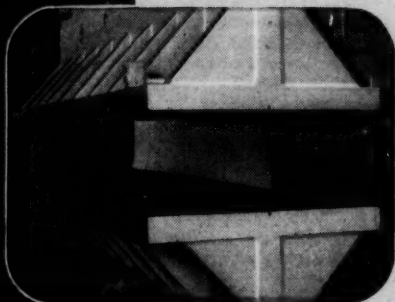
SHAPERS • SHEARS • BRAKES

areas . . .

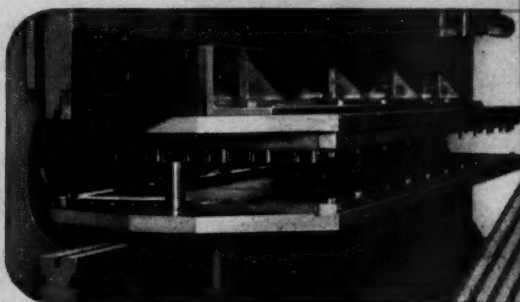
on Cincinnati Press Brakes



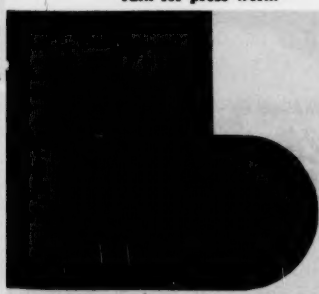
More and more jobs are being done on versatile Cincinnati Press Brakes. Removable or fixed brackets with large die areas permit many jobs to be done both in the Press Brake and Press fields. When dual purpose performance is required removable brackets are used—for Press work only, fixed brackets are furnished. Brackets are designed to sizes desired.



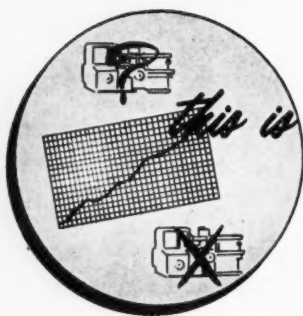
• Large area, permanent wide bed and ram for press work.



• Large area, removable upper and lower brackets.



Investigate! Our Engineering Department will be glad to advise you on the profit and production possibilities in your shop. Write for Catalog B-4.



this is your problem in 1954!

Industry is now planning the rejuvenation of its manufacturing processes and equipment for the competitive era ahead.*

It's a time-consuming job.

How can it be speeded up for you?

**see the 1953 ASTE Obsolescence Report*



what ASTE is doing to help you

The American Society of Tool Engineers is assembling in Philadelphia's Convention Center on April 26 to 30 inclusive the latest in production equipment and processes available from over 450 manufacturers. The exhibits will be open to you and your key men during these five days, from 9:00 A.M. to 5:00 P.M. Included will be inspection and automation devices, machine tools, accessories, cutting tools, and allied equipment.

Simultaneously, a series of top-level Conferences will be held dealing with such major industrial problems as Plant Management, Automation, Precision Control, Metal Forming, and Assembly Methods.



it's up to your key men NOW!

... whether your company moves forward or falls behind in the competitive era ahead. To help you select the key men in your organization who definitely should visit the Exposition, the ASTE has prepared a "plan booklet" which covers every aspect of the ASTE Exposition and Conferences. Write today for a copy on your company letterhead. It will be mailed to you promptly, free of charge.

Available on request to all industrial executives.



This advertisement is sponsored by the 27,600 Members of

THE AMERICAN SOCIETY OF TOOL ENGINEERS



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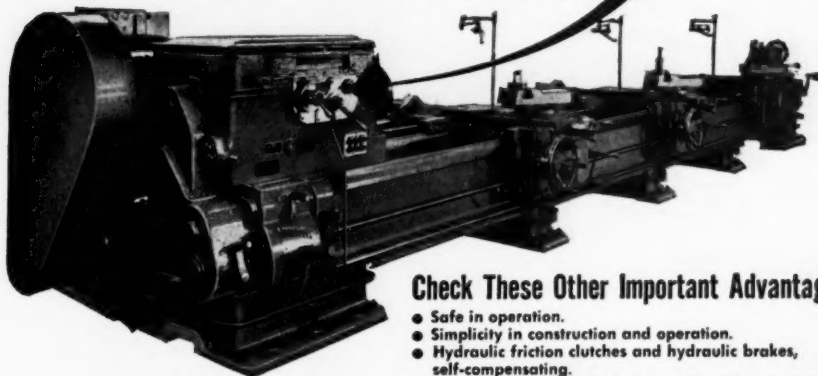
Detroit 38, Michigan



Just a "Twist of the Wrist" does it!
 ... The Lehmann
HYDRATROL LATHE
 gives 16 Spindle Speed
 changes with Automatic
Slide Rule Selection.

Just a turn of the hand wheel on the front of the headstock of the LEHMANN Hydratrol Lathe gives you a speed change! An automatic slide rule, co-ordinated with the movement of the handle, shows spindle revolutions per minute and indicates a slide rule calculation of the cutting speeds in feet per minute.

Calculation by the operator is unnecessary. The rotary handle provides all speed changes for 16 forward and 8 reverse speeds. No need for intermediate stop; unnecessary to disengage the friction driving clutch to change speed.



Check These Other Important Advantages:

- Safe in operation.
- Simplicity in construction and operation.
- Hydraulic friction clutches and hydraulic brakes, self-compensating.
- Automatic safety relay, for harmless and easy engagement of positive clutches when speeds are changed.
- Spindle release for chucking.
- Perfect, safety-control lubrication with filtered oil.
- Gears constantly in mesh.

Write today for additional information or catalog
 — or — send prints for time- and- money- saving
 recommendation!

LEHMANN MACHINE COMPANY

GRAND AT CHOUTEAU • ST. LOUIS 3, MO.
 DIVISION OF NOVO ENGINE CO



Radius
Forming
Tools



"Tru-Line"
Profile
Dressing
Tools



Diamond
Grit Tools
for Thread
Dressing



"Tru-Thread"
Thread
Dressing
Tools



"Smash the Great Diamond, Before My Eyes!"

Vasilica was undoubtedly one of the most beautiful women in the whole world. Ali Pasha, Khedive of Egypt, was sure of it, and for such a treasure, what gift more fitting than this great diamond!

Treasured for centuries by Indian princes, it had been presented to Lord Piggott when he was Governor of Madras. When he died in 1770, it had been sold for \$50,000 to a London pawnbroker who organized a lottery for the "Great Piggott Diamond" and saw it won by a poor clerk who quickly sold it and disappeared.

Recut to dazzling brilliance, it was presently offered to Ali Pasha who happily paid \$150,000 for it and said, "Now, I have *two* great treasures—Vasilica and the great diamond."

But, Ali Pasha also had a deadly enemy, Raschid Pasha, who hated him and coveted his treasures and whose trained assassins awaited—and struck.

Realizing that his beloved treasures might now fall to his enemy, Ali gave one last command: "Smash the great diamond—before my eyes, and my dear wife, let her be strangled." But, while the slave was hammering the jewel to dust, Vasilica quietly slipped away and escaped.

Diamonds have played many such dramatic parts in the pageant of history, but today their greatest role is in the field of industry. And, for 43 years we have been serving industry by importing fine diamonds and making fine diamond tools. Our field engineers are at your service.

WHEEL TRUEING TOOL COMPANY

38-3200 West Davison Avenue • Detroit 38, Michigan

ESTABLISHED 1910

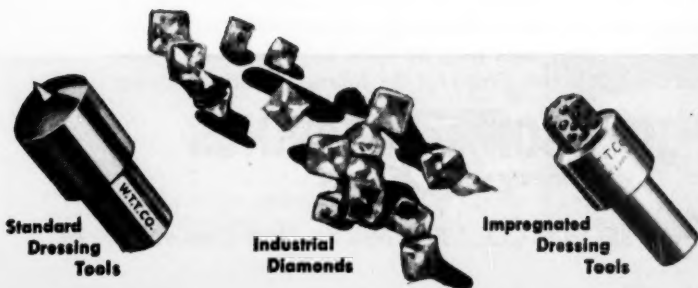
Offices in Principal U. S. Cities—Agents Throughout the World

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33 West Street, Bloomfield, N. J.

WHEEL TRUEING TOOL COMPANY OF CANADA, LTD.

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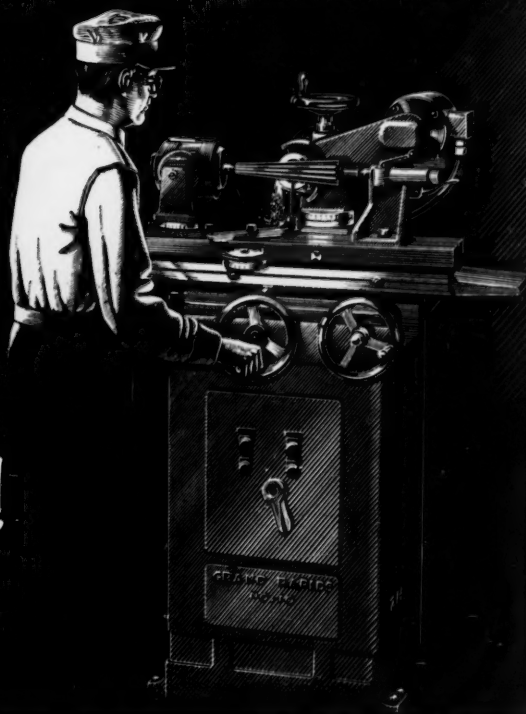


When you require a sleeve bearing . . . first investigate the line of standard, stock size Johnson Bearings. Your local Johnson Distributor can furnish more than 90% of your requirements right from stock . . . General Purpose (GP) Cast Bronze, Self-Lubricating Ledaloyl, Graphited Bronze and Electric Motor Bearings . . . each in a large range of sizes. Many other uses may be filled by Universal Bronze Bars and Babbitt Metal. Write for the Johnson Bearing Catalog.

JOHNSON BEARINGS
Sleeve-Type

JOHNSON BRONZE CO., 590 S. Mill St., New Castle, Pa.

**Dull
tools
cost
you
money!**



The sharpness and efficiency of production tools materially affect your production costs — and profits. Because they meet such exacting requirements, Grand Rapids Universal Cutter and Tool Grinders have won industrial acceptance the world over. Models No. 10 and No. 12 are available for delivery upon short notice. Available for later delivery are larger Hydraulic Feed Universal and Tool Grinders. Write today for full data on models to meet your requirements.

GALLMEYER & LIVINGSTON CO.
308 Straight Ave., Grand Rapids, Mich.

**GRAND RAPIDS
GRINDERS**

MANUFACTURERS OF SURFACE GRINDERS, CUTTER
AND TOOL GRINDERS, TAP AND DRILL GRINDERS.



The Biggest Pay-Off...

THE WINNING FINISH!



IN TODAY'S KEENER COMPETITION, IT'S THE FINISH THAT SELLS! You can **SELL MORE**—and **SAVE MORE**—with Brightboy. In many instances Brightboy achieves finishing time savings up to 50%!

Brightboy gives you finer, faster burring, cleaning, finishing, polishing, **IN ONE OPERATION.** It finishes products, assemblies, parts, in **ALL METALS, PLASTICS, WOOD AND LAMINATED MATERIALS.**

Brightboy's special-formula *cushioning* rubber and *matched* abrasive do the job. The combination-action of *rubber and abrasive working together* gives you the faster, finer finish that enables you to outsell competition. You'll discover—and profit by—

Brightboy's revolutionary concept of finishing . . . and applications far beyond the range of other methods. Among the six Brightboy textures you'll find at least one that's just right to give you the finer, faster finishing that clinches sales and multiplies profits.



WHEELS,
STICKS,
RODS,
BLOCKS
for machine
and manual
operations

BETTER FINISHING DATA

is no further away than your regular dealer. Ask him for the Brightboy Catalog Manual. Write us if he cannot supply you, or on any problem where finishing is involved.



BRIGHTBOY INDUSTRIAL DIVISION
WELDON ROBERTS RUBBER CO.
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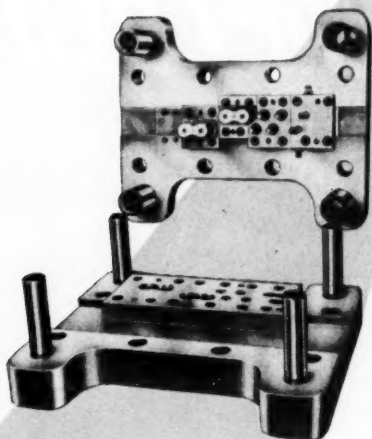
America's Pioneer Manufacturer of Rubber-Bonded Abrasives



FOR FINISHING ALL METALS, PLASTICS, WOOD, AND LAMINATED MATERIALS

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links up with... **PRODUCTO** DIE SETS



MATERIAL

$\frac{1}{4}$ " SAE 3140 hot rolled steel in coiled stock.

OPERATIONS

Station No. 1 — Whitney Chain markings clearly embossed on each link.

Station No. 2 — Four holes, two to a link, rough pierced.

Station No. 3 — Two chain links blanked out on each press stroke.

TOLERANCES

Hole diameter + .0005" — .0005"

Hole centers + .001" — .001"

Link Contour + .005" — .010"

Die Set face parallel to feed slot + .002" — .002"

PRODUCTION RATE

153,000 links blanked per 40 hour week.

Between grinds, 75,000 pieces.

NEED PROMPT SERVICE?
CALL YOUR NEAREST
PRODUCTO ASSEMBLY BRANCH

Tough, $\frac{1}{4}$ inch-thick hot rolled steel chain links are not an easy stamping job... especially when heavy production must be matched with close tolerances and excellent finish.

Here are the figures as this job rolls along at Whitney Chain on Niagara presses equipped with PRODUCTO 4-pin progressive die sets. It's typical of the way Producto Service teams up to set production records.

THE PRODUCTO MACHINE COMPANY
910 Heustatonic Ave., Bridgeport 1, Connecticut

For Precision Die Sets Fast Call...

ALSO MAKERS OF TOOL AND DIE MAKERS ACCESSORIES, VISES, MACHINERY
3PD52B



MAGNETIC CHUCKS BY *Magna-Lock*

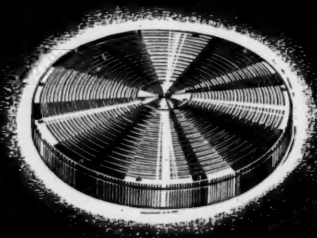
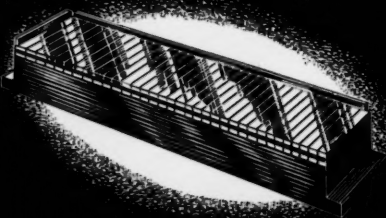
...largest exclusive builder of magnetic chucks

3 TYPES
for every flat-
surface machining
job...large or small!

RECTANGULAR ... work held
to extreme edges of chuck. Sizes
to 36" x 96".

ROTARY ... inserted ring-type,
6½" dia. to 48½" dia. Also
sectional type for automatic
loading, unloading.

SWIVELING ... for knife and
shear blade grinding, many
machining operations.



Get full details on
Magna-Lock Mag-
netic Chucks and
Devices.

WRITE DEPT.
MM-24

Magna-Lock

Hanchett **MAGNA-LOCK CORPORATION**
Magnetic Chucks and Devices
BIG RAPIDS MICHIGAN, U. S. A.

Budget Cut?

We Can Help You

Let us show you how to cut costs with the

SUPERIOR Model "AL" HONING MACHINE

Infinitely variable speeds from 250 to 1150 r.p.m. with tachometer. Quick, easy adjustment.

Smooth running, ball bearing, hardened spindle.

Foot-controlled, disc-type clutch and brake. 220/440 volt, $\frac{3}{4}$ h.p. ball bearing spindle drive motor. 1/10 h.p. centrifugal-type coolant pump.

Magnetic starters. Service light.

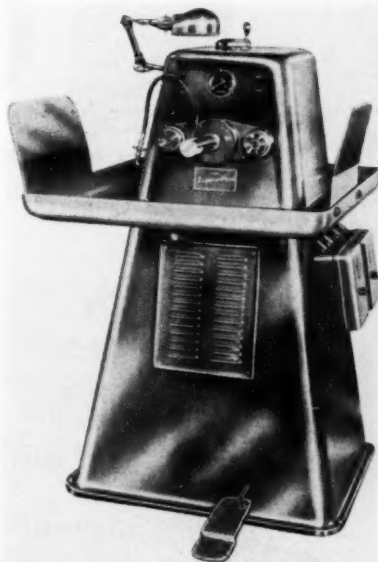
Accepts standard mandrels, 3/16" to 3", in the same spindle. No adapters required. Wide honing range of each mandrel cuts original costs.

No metal-to-metal contact to wear out mandrels as well as stones.

Larger area stone cuts faster, lasts longer.

Hones over keyways and splines with standard mandrels and stones.

Consider all these ways the Superior Honing Machine saves you money and then use coupon to get free catalog and the name of your nearest-stocking dealer. Mail it now!



SUPERIOR HONE CORPORATION

1615 ELRENO STREET

ELKHART, INDIANA

Please send free catalog on Superior Honing Machines.

NAME _____

FIRM _____

STREET _____

CITY & STATE _____

Mr. and Master Mechanics

This is Dad's special day . . . Family Open House at Lodge & Shipley . . . time when he can show off to his youngster. Perhaps making lathes doesn't seem as thrilling now to the boy as being a baseball star, but Son's impressed with the "wonderful" lathes . . . and Dad's beaming.

The youngster is like the thousands of Lodge & Shipley lathe users who for decades have been impressed by the results of craftsmanship like his Dad's. They see in the intricate Lodge & Shipley headstock, with its 599 precision parts, workmanship that won't make headlines . . . but will help in the struggle against ever-rising costs.

Write for case histories.

Lodge & Shipley

....your LODGE-ical choice!

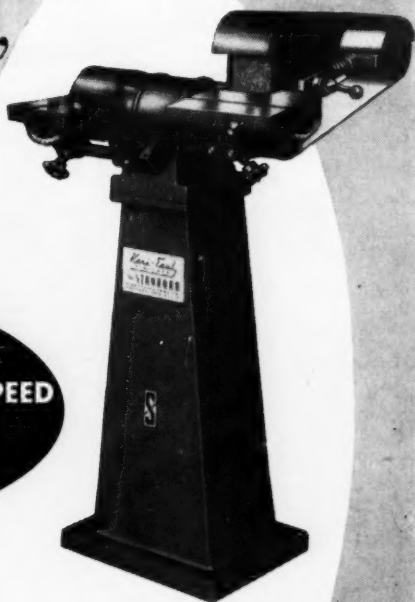
3055 Colerain Avenue
Cincinnati 25, Ohio



**Standard's new
combination
grinder and
belt finisher**

**OFFERS ROUGH AND
FINISH GRIND FOR HIGH SPEED
STEEL AND CARBIDE
TOOLS**

Standard's leadership again offers users the convenience of "ONE STEP FROM ROUGH TO FINISH GRIND". Tools are rough ground on a silicon carbide wheel and then finish ground on an abrasive belt. The wear resistant platen permits uniform micro finish of end, top and side clearance angles on single point tools *without* diamond wheels or skilled operators. Also available with abrasive belt attachment only.



Type 67

Vari-Tool
FINISHER

Price \$497—FOB Cincinnati
Prompt Delivery

This Vari-Tool Finisher is the only versatile unit of its kind available today.

Standardize with
the STANDARD electrical tool co.
MACHINE TOOLS

2487 RIVER ROAD • CINCINNATI, OHIO

SELECT THE RIGHT PRESS

Floor Model

5
TON

5
TON

Bench Model



... with
PROFIT-PERFORMANCE
'built-in'!

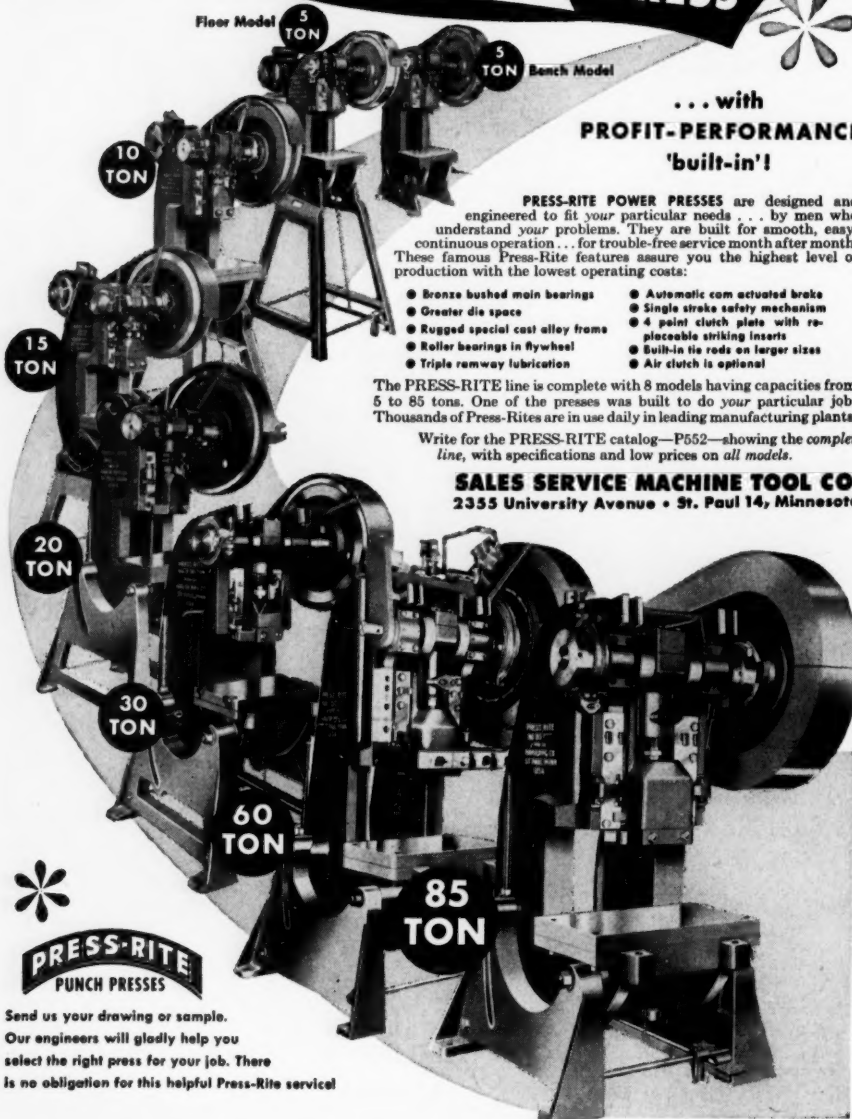
PRESS-RITE POWER PRESSES are designed and engineered to fit *your* particular needs . . . by men who understand *your* problems. They are built for smooth, easy, continuous operation . . . for trouble-free service month after month. These famous Press-Rite features assure you the highest level of production with the lowest operating costs:

- Bronze bushed main bearings
- Greater die space
- Rugged special cast alloy frame
- Roller bearings in flywheel
- Triple ramway lubrication
- Automatic cam actuated brake
- Single stroke safety mechanism
- 4 point clutch plate with replaceable striking inserts
- Built-in tie rods on larger sizes
- Air clutch is optional

The PRESS-RITE line is complete with 8 models having capacities from 5 to 85 tons. One of the presses was built to do *your* particular job. Thousands of Press-Rites are in use daily in leading manufacturing plants.

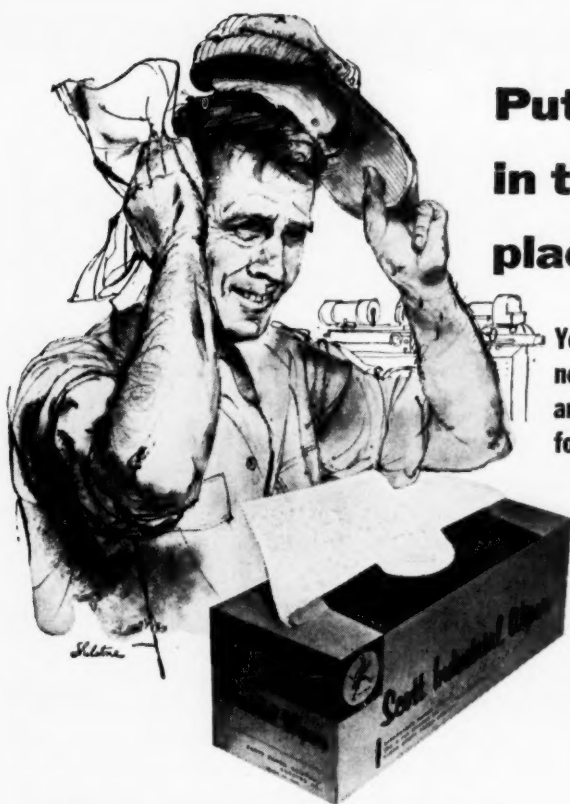
Write for the PRESS-RITE catalog—P552—showing the complete line, with specifications and low prices on *all* models.

SALES SERVICE MACHINE TOOL CO.
2355 University Avenue • St. Paul 14, Minnesota



PRESS-RITE
PUNCH PRESSES

Send us your drawing or sample.
Our engineers will gladly help you
select the right press for your job. There
is no obligation for this helpful Press-Rite service!



Put yourself in this worker's place . . .

You'd know immediately why
new Scott Industrial Wipers
are setting a new standard
for industrial wiping

Scott Wipers are disposable. A
thrown-away wiper carries harm-
ful liquids and metal chips with
it, thus protecting the workers
from cuts and scratches.

Within just a few short months,
Scott Industrial Wipers have taken
hold *fast*. More and more key men are
finding that industrial wiping can at
last be scientific—a regular phase of
production.

These strong, absorbent Scott Wipers
are designed for almost any wiping
job. They are uniform in size, color,
and absorbency. One Scott Indus-
trial Wiper can be used several times
before being thrown away.



SCOTT PAPER COMPANY

Experience shows that it will be to
your advantage to let us make a sur-
vey of your individual requirements
to see how Scott Industrial Wipers
can best fit into your operation. For
more information, please fill out
this coupon or contact your local
Scott distributor.

For further information, mail this coupon to
Scott Paper Co., Dept. MM-D, Chester, Pa.

Name

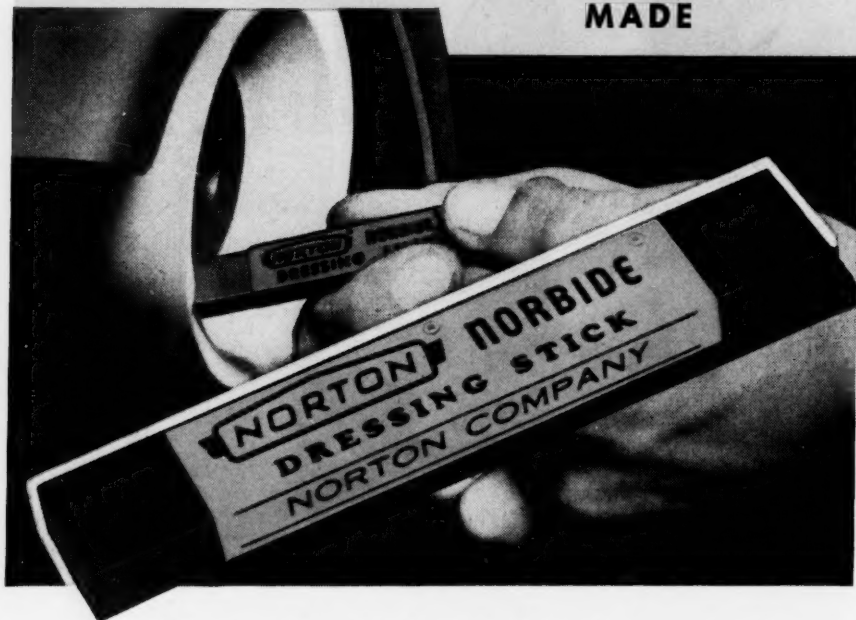
Position

Company

Address

City State

NORBIDE® LONGEST WEARING DRESSING STICK MADE



With one of these handy, lightweight sticks you can quickly and easily keep vital tool wheels in top cutting condition. Just a couple of passes with a NORBIDE Dressing Stick is all it takes to clean up a wheel face, dress a radius or groove or touch up a cup or saucer wheel. And with this conveniently sized stick you can see more of the wheel and thus avoid costly overdressing.

A NORBIDE Stick of boron carbide—the hardest material made by man—will outlast hundreds of ordinary abrasive sticks. You'll find it will greatly reduce dressing dust nuisance also.

Order a supply of these cost-cutting sticks from your local Norton distributor or write for Form 1567 giving more details.

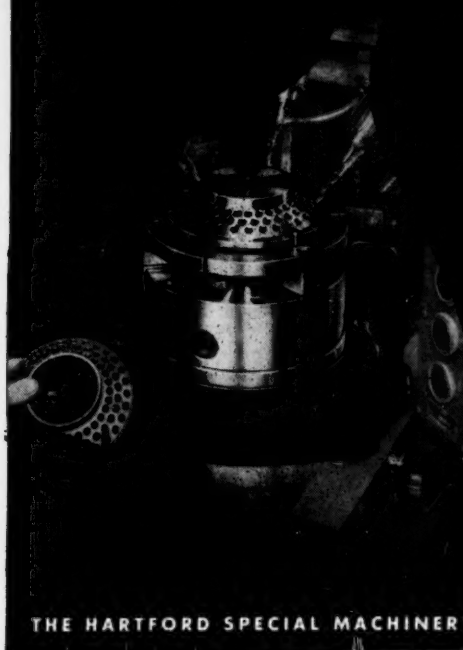
NORTON COMPANY
49 New Bond Street
Worcester 6, Mass.

NORBIDE®... the hardest man-made abrasive

SAVE TIME

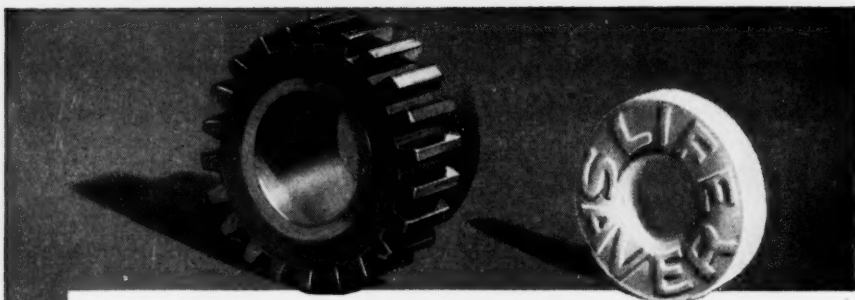
with HARTFORD SPECIAL

SUPER-SPACERS

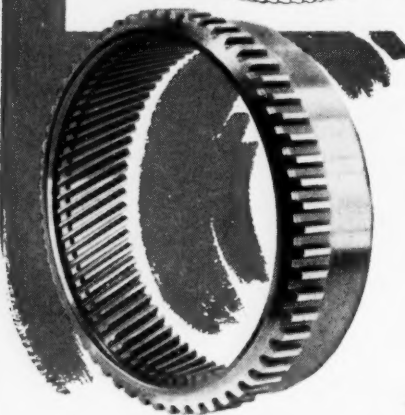


HARTFORD
Special

THE HARTFORD SPECIAL MACHINERY CO., HARTFORD 12, CONN.



A GREAVES GEAR CAN BE A LIFE SAVER!



Ability to get good gears quickly in case of a breakdown—or for any other reason—can be a real 'life-saver'. Greaves offers that kind of service . . . the kind you can depend on when machinery is down and every minute counts. And Greaves is a good source for your day-to-day gear requirements, too. Why not write or wire us today for a prompt estimate. No obligation naturally.

Greaves makes spur, helical, bevel and worm gears, pinions, worms and leadscrews . . . in sizes from the small 'life-saver' variety up to—how big do you need 'em?

GREAVES

MACHINE TOOL
COMPANY

2700 Eastern Avenue, Cincinnati 2, Ohio

Established 1917

• Division J. A. Fay & Egan Co.

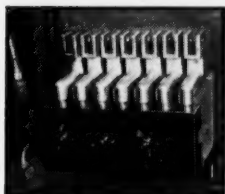


Makers of
Greaves Milling Machines

Do your machining up to 10 times faster!



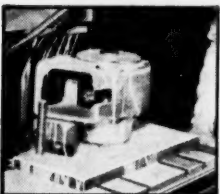
• Originally turned on lathe, now rough and finish-ground at 600 per hour.



• These pieces formerly milled now belt-ground 5 times faster.



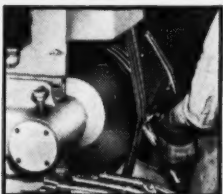
• Grinds broad areas flatter and faster than radial surface grinder.



• This grinding operation 100% faster than former milling time.



• Generates 2 radii at double the output by hand filing and polishing.



• Replaces polishing jack — eliminates costly setting up of glued wheels.

Porter-Cable ABRASIVE BELT GRINDERS

Abrasive Belt Grinding removes stock rapidly, provides fine finish free of tool marks. Greatly simplifies fixtures — or eliminates them entirely. (Often makes hand presentation possible.) Is up to 10 times faster than milling, shaping, polishing or ordinary grinding — frequently saves 75% to 90% of previous set-up time.

Wet-belt or dry-belt models (determined by material to be worked) available for flat surfacing, contour grinding, centerless grinding, generating radii, beveling, burring and polishing.

Let us prove that an Abrasive Belt Grinder can reduce the cost of many operations. Send us sample pieces for recommendations — or ask to have one of our production engineers discuss your problems at your convenience, at your plant. Free 32-page case history booklet on request.

Announcing...

Porter-Cable Abrasive Belt Grinders are now made and sold by Engelberg Huller Co., Inc. — manufacturers of precision machinery since 1888.

Grinders for every application



Planar Grinders



Contour Grinders



Flexible Belt Grinders



Centerless Grinders



Bench Grinders



Constant Grinders

The ENGELBERG HULLER CO., INC.

102 Seneca Street

Syracuse, N. Y.

in vertical and horizontal grinders

YOUR BEST BUY IS BUCKEYE

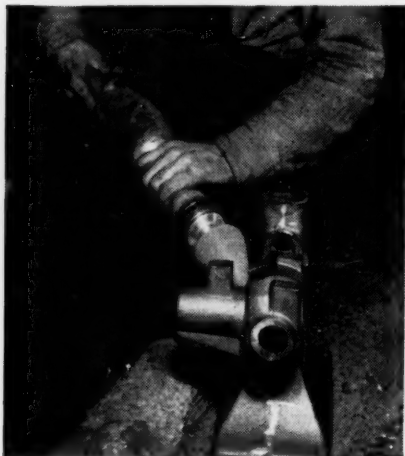
When you're completely satisfied with the quality of your products, and quite happy with your low production costs, just sit back—and watch your competition move out ahead!

Or, better still, start looking for methods to improve product quality and reduce production costs. Like an Ohio foundry, where a test *proved* that a lighter, faster Buckeye portable grinder could do an

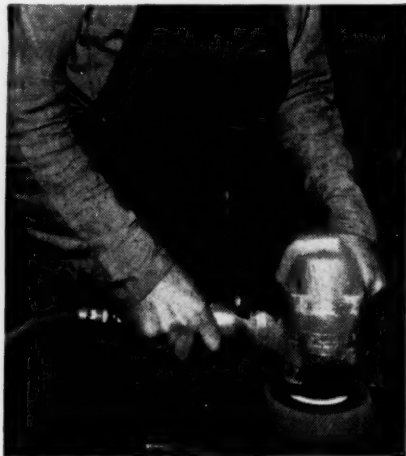
even better job, in less time, at lower cost. And, as a "bonus," this grinder has been operating for more than two full years without any repair service required.

In every industry, it's time to improve your competitive position. If this involves portable air tools, it's time to test Buckeye Tools in your plant, to *prove* them to your own satisfaction. May we send you a copy of our Air Tools Catalog?

Getting into the corners is easy with this lightweight, maneuverable Buckeye horizontal grinder. Faster speed means less wear on cone wheels, too.



On jobs where large, relatively flat surfaces are worked, Buckeye vertical grinders help increase productive output, improve product quality.



Buckeye Tools
CORPORATION
DIVISION 17 • DAYTON 1, OHIO

producers of
the world's first
successful
rotary air tools

TOOL LIFE UP 75%

DOWN-TIME DOWN 43%

PRODUCTION UP 45%

**USING
SHEAR-SPEED
SOLUBLE OIL**

on multiple "single-point" form cutting operation in the plant of a large auto manufacturer. IMPARTIAL PRODUCTION TESTS of previous "best" cutting fluid vs. SHEAR-SPEED Soluble Oil were run under *exactly* similar conditions—same machine, same parts, same tool grinding, same coolant flow.



JOB SPECS:

24-tooth transmission gears, 2.5" pitch dia., 1.185" face width, cut two at a time on gear shaper from SAE bar steel, 207-228 BHN.

**ACTUAL TEST
DATA
(averaged)**

Previous Best
Cutting Fluid

SHEAR-SPEED
Soluble Oil

OVERALL
TOOL LIFE

DOWN-TIME
PER PART

PARTS PER HR.
(INC. DOWN-TIME, ETC.)

CYCLE TIME*
(FLOOR-TO-FLOOR)

15,200 parts
26,600 parts

.0623 min.
.0357 min.

86
125

55 sec.
35 sec.

75% improvement

43% improvement

45% improvement

36% improvement

*Tool life increased despite higher cutting speed.

A few select sales areas still available.

Convince yourself of the amazing advantages and versatility of SHEAR-SPEED Soluble Oil in your own plant. Sold only on a satisfaction guaranteed test basis. Write for Bulletin SO-53 and price list.

SHEAR SPEED
CHEMICAL PRODUCTS

7125 E. McNICHOLS RD. A Division of Michigan Tool Co. DETROIT 12, MICH.

**MEET
THE
MODERN**

- A LATHE TO SPARK YOUR FANCY
- A LATHE TO WIN YOUR LOYALTY
- A LATHE TO MEET YOUR NEED

FORGET OLD NOTIONS
about engine lathes

BOYÉ & EMMES
HEAVY DUTY ENGINE LATHE LONG LIFE



● **SERIES BB**
● **EIGHTEEN SPEEDS**

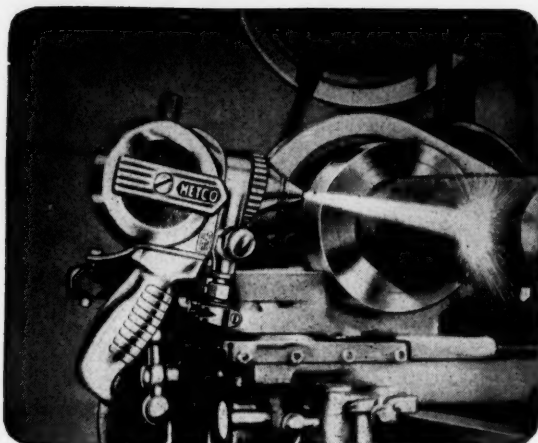
● The outstanding value which is built into all Boyé & Emmes Long Life, Heavy Duty Engine Lathes is evident in the extra quality features discussed in this folder. Compare Boyé & Emmes specifications and features. You will find shorter shafts, more rigidity, greater speed ranges, more compact design throughout. Put one to work in your production and watch it become the "preferred" turning tool among the men who judge by day-in day-out performance.

HEAVY DUTY LATHES SINCE 1895

THE STORY is told in detail in
Boyé & Emmes Bulletin No. BB531

WRITE FOR IT! . . . no charge

BOYÉ & EMMES
MACHINE TOOL COMPANY
123 CALDWELL DRIVE
CINCINNATI 16, OHIO
MACHINE TOOL CENTER of the WORLD



now a really low-cost metallizing installation... with the new Metco L-Gun

New, low, compressed-air requirements... only 10 cfm at 40 to 60 psi, already available in many shops, or supplied by inexpensive 3 hp compressor... bring metallizing within reach of the small user.

Here's a chance for the smaller maintenance shop to get into profitable metallizing operations like these:

- ▶ Save up to 90% of replacement costs on machine repair jobs.
- ▶ Do your own hard-facing.
- ▶ Apply long-wearing corrosion-resistant coatings to exterior plant structures, tanks and other equipment.

Sprays 23 Different Metallizing Wires—With the new L-Gun you can spray .10, .25, .80 carbon steels, stainless; babbitts, brass, bronze; nickel, aluminum, tin, zinc; special hard-facing materials such as Metco-Weld H, and the new self-bonding Sprabond wire.

It's Versatile—Use the L-Gun machine-mounted or hand-held—it weighs only 4 lb. 2 oz. Do all kinds of metallizing work—shaft and bore build-up with harder, longer wearing metals; build up worn pump plungers, crankshafts, motor shafts; apply corrosion-resistant coatings. There are hundreds of different jobs that are "naturals" for metallizing.

Same High Quality as Other Metco Guns—The low air requirements of the new L-Gun have been achieved without any

sacrifice in Metco quality. It embodies new developments in turbine and nozzle construction—is built, like all Metco guns, for rugged, dependable service.

A Real Opportunity for the Smaller Shop—Thousands of large, well-known companies have been metallizing users for many years, not only in maintenance but in production applications on original equipment. Now, with the development of the new L-Gun, and a low cost installation, metallizing is within the reach of even the smallest plant. (We'll be glad to send you the names of some Metco users—large and small.)

Free Bulletin or Shop Demonstration—Send off the coupon for the detailed information Bulletin 55 gives you. Or, better still, ask for a demonstration in your own shop by a Metco Field Engineer. He'll be glad to show you how the new Metco L-Gun works on some job of your own. No obligation, of course.



Metallizing damaged journals on turbine shaft



Building up worn brake-drum



Metallizing protective coating on steel plate

See other examples of metallizing illustrated in our 8-page Bulletin in your Sweet's Plant Engineering File—Section 7 to Me. The following names are the property of Metallizing Engineering Co., Inc.
METCO® • Sprabond wire • Metco-Weld

1 REG. U. S. PAT. OFF.

METALLIZING ENGINEERING CO., INC.

38-14 30th STREET

LONG ISLAND CITY 1, N. Y.

In Great Britain: METALLIZING EQUIPMENT COMPANY LTD. Chobham near Woking, England



Don B. Watson
METALLIZING ENGINEERING CO., INC.
38-14 30th Street Long Island City, New York

- ☐ Please send me more information about metallizing
☐ Please arrange a demonstration in my shop.

Name _____

Company _____

Address _____

City _____ Zone _____ State _____

Doing the Hole Job — Better, Faster, at Lower Cost

With

BESLY

The World's Most Accurate

TAPS

• LET US PROVE that Besly can help you get better threaded parts, longer tap life and lower tapping costs.

Ask your authorized Besly Distributor for a TRIAL RUN on your toughest jobs . . . PLUS details on Besly's Super-Service on "Specials".



BESLY-WELLES CORPORATION

Established as Charles H. Besly & Co. in 1875
108 Dearborn Ave. • Beloit, Wisconsin

BESLY Drills, Reamers and End Mills—High-Speed Cutting Tools in a complete range of types and sizes.

UNSURPASSED ACCURACY AT ALL VITAL POINTS



Microcentric CHAMFER



Accurate
RAKE ANGLE



Solid-Ground THREAD FORM



Mirror-finish
FLUTES



Tru-Square DRIVER

TAP TIPS

The handy "Handbook for Tap Users" is full of information on tapping methods and tap selection. Write for your Free Copy.



WHAT COVEL'S 80 YEARS CAN MEAN TO *you*

when you select a surface grinder

It takes more than special features and fine materials to build the best surface grinders. Skilled workmanship, yes... modern methods and equipment, certainly. But there's a rare quality—a plus value that can make your grinder investment extra sound and that quality is yours with Covell. It's simply this EIGHTY YEARS OF CUMULATIVE EXPERIENCE—of constant progress, keeping pace through four war production periods and through many business peaks and valleys.

So, when you select a Surface Grinder—or a Cutter and Tool Grinder, call on Covell and draw on this wealth of practical, productive experience. Send for data.



**UNIVERSAL
CUTTER and TOOL GRINDERS**
10"x30"; 10"x24"; 8"x16"



SURFACE GRINDERS
HYDRAULIC FEED:
14"x24"; 8"x24"; 6"x18"
HAND FEED: 6" x 18"

Send for
Bulletin M-24

COVELL

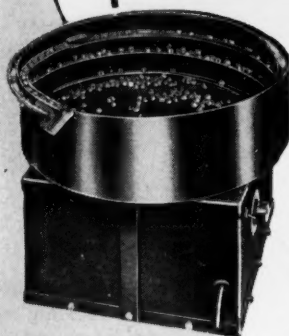
**PRECISION
GRINDERS**
BENTON HARBOR, MICHIGAN

DRILL GRINDERS • UNIVERSAL CUTTER & TOOL GRINDERS • HYDRAULIC & HAND FEED SURFACE GRINDERS

Announcing...
 a New addition to our
 popular line of **SELECTIVE
 FEEDING DEVICES**
**NOW! A FEEDING UNIT FOR ALMOST
 ANY SPECIFIC APPLICATION!**

Also **EXTENDED
 ENGINEERING SERVICE—**
 ENABLING US TO DO THE COMPLETE TOOLING
 FOR YOUR INDIVIDUAL FEEDING OPERATIONS

New!



● **Write Us—**
 Give Details and learn
 how our trained engi-
 neers can supply the an-
 swer to your feeding re-
 quirements

DPS BOWL-FEEDER

A proved method based on the **VIBRATORY PRINCIPLE**. Provides fully automatic, oriented, single line feeding to Grinding, Packaging, Inspecting and many other automatic machines and operations. Will scientifically feed light, fragile parts that normally could not withstand tumbling.

DPS BARREL-FEEDER

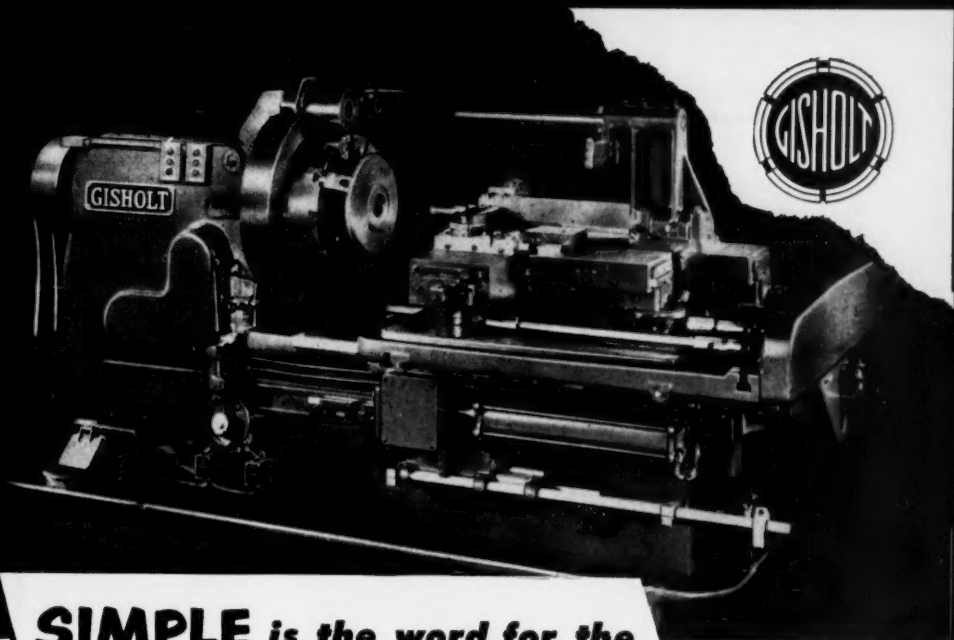
For years our popular unit, successfully used in thou- sands of plants to help speed production and re- duce costs. They were de- signed with the idea of simplicity in operation and maximum feeding, handling a wide variety of parts. Designed for constant operation.



DETROIT POWER SCREWDRIVER CO.

2807 W. FORT ST.

DETROIT 16, MICH.

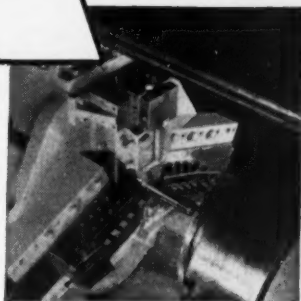


SIMPLE *is the word for the* **SIMPLIMATIC!**

Wherever you have a sufficient run of similar parts, the Simplimatic Automatic Lathe can solve several of your problems at once.

1. High speed production assures larger output at lower cost per piece.
2. The wide variety of tool arrangements on the large, flat table of the Platen Type Simplimatic (shown above) makes it adaptable to a wide range of work.
3. Training time is reduced to a minimum because the entire machining cycle is completely automatic. One operator normally runs several Simplimatics.

The extreme flexibility of the standard Simplimatic can frequently give you all the advantages of a machine designed especially for your job. If you want simple, quick, lower cost production, this is a good time to investigate the Gisholt Simplimatics. Ask for literature.



The Radial Type Simplimatic is ideal for machining flywheels, etc., with wide faces and multiple inside and outside diameters. Extreme rigidity permits multiple tooling and maximum cutting speeds, sustained accuracy and excellent life of cutting tools.



THE GISHOLT ROUND TABLE

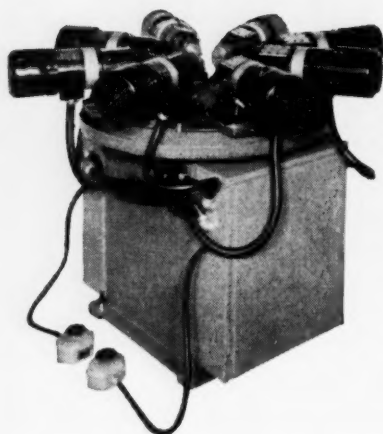
represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

GISHOLT

COMPANY

Madison 10, Wisconsin

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES



REDUCE YOUR COST OF RADIAL HOLE DRILLING!

A Standard Machine Designed for Variety Production

Why build a special machine for drilling radial holes when a standard machine equipped with Govro-Nelson Automatic Drilling Units will, in many cases, perform the work of a special machine that would cost considerably more!

Any number of drilling units up to eight may be employed, the units being movable not only through 360 degrees on the circular table but also movable endwise on riser plates to meet the requirements of the part being drilled.

The machine may also be used for tapping operations with Govro-Nelson Tapping Units. It has a range of 1/32" to 3/8" on drilling operations and 0-80 to 3/8-16 on tapping operations, depending on material and spindle speeds. A single, momentary contact start-button causes all units to operate simultaneously.

If you are interested in reducing the cost of your radial drilling and tapping operations, write for price and dimensional data.

WRITE FOR
Literature

GOVRO-NELSON CO.

Machinists of Precision Parts for 30 Years

**1933 Antoinette
Detroit 8, Mich.**

Automatic **DRILLING UNIT**

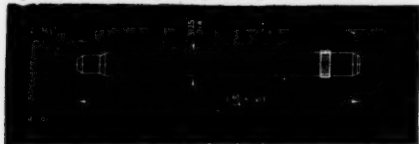
LIPE AUTOMATIC BAR FEEDS

MAGAZINE LOADING

Doubled PRODUCTION!

THE machined worm wheel shaft and agitator rod shown below are typical of the many parts turned out on a bank of seven screw machines equipped with Lipe AML Bar Feeds at Hamilton Beach Division, Scovill Mfg. Co., Racine, Wis., manufacturers of food mixers, vacuum cleaners, hair dryers and other motorized appliances.

No lost time in loading and hand feeding! . . . No scratching of high-finish stock! . . . No idle operation of screw machines! . . . Maximum production capacity fully maintained!



Long worm wheel shaft .3125" dia. machined from piston rod finish, cold-drawn steel. When the Lipe AML Bar Feed automatically loaded and fed the stock to a Model 2G B&S, production increased 100% over conventional loading operation.



Agitator rod .250" dia. machined from S.A.E. #1112 Bessemer wire. When the Lipe AML Bar Feed automatically loaded and fed the stock to a Model 00G B&S, production increased 100% over conventional loading operation.

On job after job there is proof—like these examples from a typical four-week production run—that Lipe Automatic Bar Feeds insure big production gains, BECAUSE:

- Stock is fed to screw machines all the time . . . not dependent on operator.
- Feed pressure constantly behind stock.
- Eliminates feed fingers.
- Avoids multiple feed finger feedouts.
- Model AML gives maximum output of machine . . . no "cutting air."
- Saves change-over set-up time.

Get full details on how this machine will increase production and save you money. It's today's big advancement in screw machine stock feeding. Our engineers will gladly study your problem . . . no obligation.



Lipe - ROLLWAY CORPORATION

Manufacturers of Automotive Clutches and Machine Tools
Syracuse 1, N. Y.

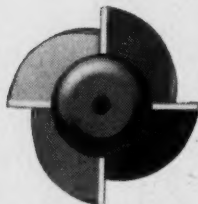
AN IMPROVED STANDARD COUNTERBORE DESIGN by ECLIPSE

NEW!

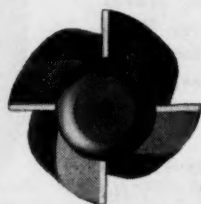
FLUTE DEVELOPMENT GIVES YOU

- ★ Deep counterboring with a wider range of pilot sizes.
- ★ A higher helix angle which assures faster chip disposal.
- ★ New tooth construction thus providing maximum heat dissipation.

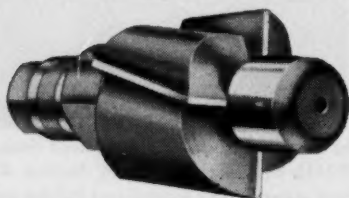
The DIFFERENCE at a glance!



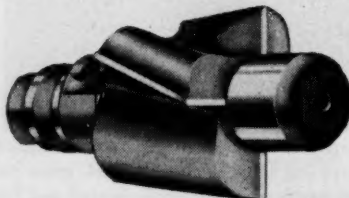
End view of counterbore showing conventional flute form, designed for spot facing and shallow counterboring.



New style flute form designed for spot facing and deep counterboring; chips can flow freely from pilot diameter.



Side view of counterbore showing conventional flute design which provides ample chip clearance for shallow counterboring and spot facing.



New style flute form with increased helix angle permitting faster chip removal, thus reducing heat to a minimum in deep counterboring.

Our present stock is being replaced with the new design as rapidly as possible so that in the very near future all orders will be filled with this later design within the range of sizes provided.

ECLIPSE COUNTERBORE CO.

Founded in 1913

DETROIT 20, MICHIGAN

**"BEST BUY . . .
the boss ever made!"**

LEACH 6 X 12 SURFACE GRINDER

**HIGH OUTPUT
at LOW COST**

Don't let the low price fool you! The Leach 6 x 12 Surface Grinder is an entirely new engineering triumph that does the **BIG** jobs. Easily and accurately handles 90% of the work of far more expensive machines. A proven giant money-saver by hundreds of enthusiastic owners. Completely self-contained . . . 2-speed ball bearing spindle, driven by a $\frac{3}{4}$ HP motor. Nowhere else can you get such high output at such low cost! Write for detailed description.



H. LEACH MACHINERY CO.

387 CHARLES STREET

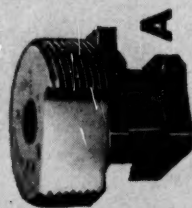
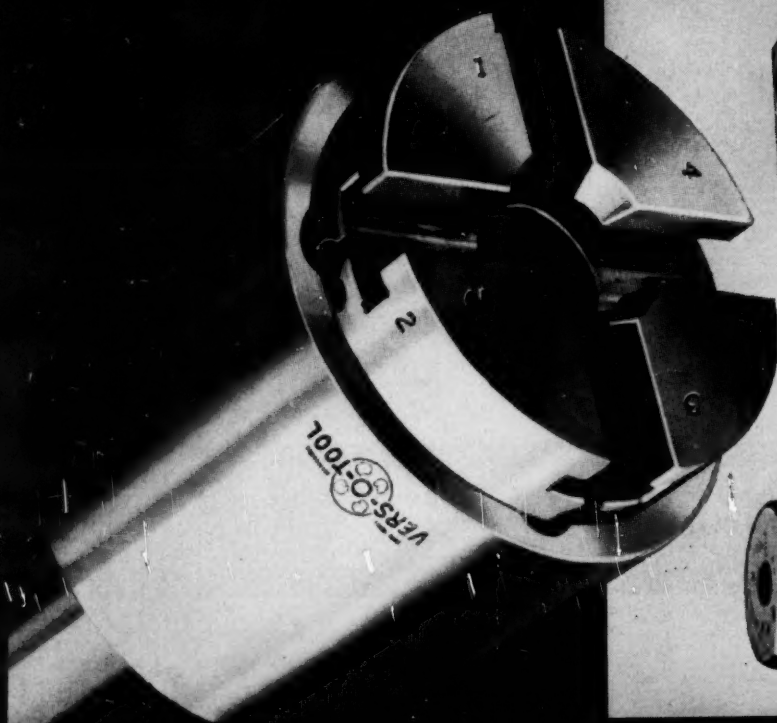
WORLD DISTRIBUTORS

PROVIDENCE 4, R. I., U. S. A.

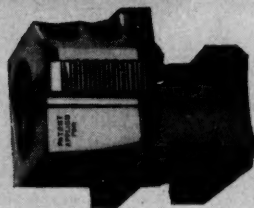
DEALERS IN PRINCIPAL CITIES

VERS-O-TOOL

CHOICE



A
CIRCULAR GROUND
THREAD CHASER
HEAD SIZES: $\frac{3}{16}$ - $6\frac{1}{2}$ "



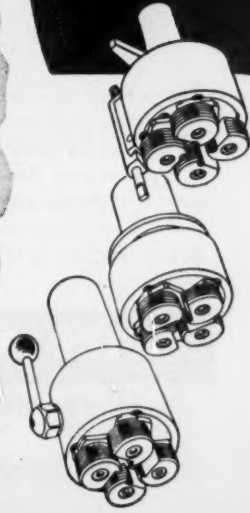
B
ADJUSTABLE
BLADE CHASER
HEAD SIZES: $\frac{3}{16}$ - 2"

It's this simple...you start with a precision built self-opening die head—the Vers-o-tool—then just choose either of two types of chasers least costly for the job.

A If it is a long run job—specify circular ground thread chasers. They give you maximum chaser life by any comparison, regrind to a full 270° circumference. Up to 10,000 threads per grind on screw stock isn't unusual.

B For smaller lot threading—use the Namco Adjustable Blade type chasers, also with ground threads.

Both styles are interchangeable, head size for head size, between revolving and non-revolving Vers-o-tools.



ONE VERS-O-TOOL and SELECTIVE CHASERS . . .

**cuts your threads . . .
cuts your tool investment
and cuts your operating costs**

This system also includes a Namco Micrometer Gage, which checks the chasers—does away with trial cuts after grinds, gives many more pieces per grind, reduces reject losses and saves wasting expensive man-hours. Class 3 threads are guaranteed—and smoother.

Every month, more threading departments join our lists of exclusive Vers-o-tool users. Maybe you'd like to try out this double-duty head. If rising costs are your problem—you should. Send a sample with "specs," large or small run, and we will show you. Ask for Catalog DT-52.



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and CHUCKING AUTOMATICS
1-4-6 and 8 Spindle • Hydraulic
Thread Rolling Machines • Auto-
matic Threading Dies and Taps •
Limit, Motor Starter and Control
Station Switches • Solenoids •
Contract Manufacturing.

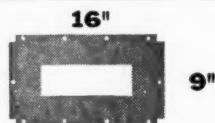
The NATIONAL ACME COMPANY

170 EAST 131ST STREET • CLEVELAND 8, OHIO

with a **WIEDEMANN** you can
Reduce **INVENTORY** and **STORAGE SPACE!**
 produce parts as required.

All
38
 PIECES
 were pierced
 in
 1/8" mild steel
 IN
28
 MINUTES
 (including
 all
 set-up)

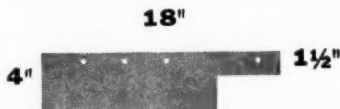
12 LIKE THIS



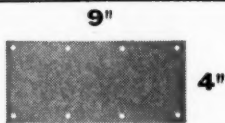
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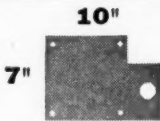
8 LIKE THIS



2 LIKE THIS



6 LIKE THIS



The company producing the above parts has eliminated inventory of these and many other items, has greatly reduced inventory of punches and dies—and they no longer need to stock templates.

The Wiedemann method enables them to ship parts directly to assembly rather than the stockroom.

Items are produced weekly or more often if necessary. Sizes of parts pierced on the Wiedemann range from 5 ft. by 10 ft. down to 2 in. squares.

Inventory and storage reduction are just two of many cost-reducing features of Wiedemann Turret Punch Presses. We'll gladly make a time study on your own work.

WIEDEMANN MACHINE COMPANY

4219 WISSAHICKON AVENUE, PHILADELPHIA 32, PA.



You'll save time and money if you use Wesson 3-Way Universal vises for angle milling, grinding and drilling. You can use "Standard" tools for "Special" work and cut set-up time in half.



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Please send me illustrated
bulletin of WESSON Universal
VISES and ANGLE PLATES.

Name and Title

Firm Name

Address

City

State



GET

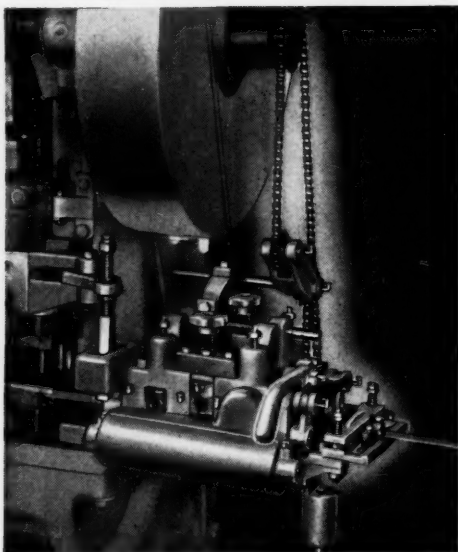
RAPID-FIRE PRODUCTION

from your PUNCH PRESSES

IT'S EASY WITH

WITTEK

Automatic Roll Feeds



Step up production by making your punch presses automatic! Wittek automatic roll feeds fit all makes and sizes of punch presses — provide maximum efficiency and extreme accuracy in the high-speed automatic feeding of strip stock. They are made in single roll, double roll, and compound types with straighteners, in models to feed (push or pull) in any of four directions. Length of feed is quickly and easily adjusted to meet individual job requirements.



4404

WITTEK Reel Stands

Simplify Handling of Coiled Stock

A choice of standard models is available to facilitate handling a large variety of coiled stock... from small, light coils to those weighing up to 800 pounds. These larger reel stands automatically center the coils and provide frictional braking action to prevent overrunning and maintain uniform coil slack.

Write for full particulars

WITTEK Manufacturing Co.

4322 W. 24th Place, Chicago 23, Illinois

Automatic

ROLL FEEDS AND
REEL STANDS





COUNTERBORES with Interchangeable Pilots

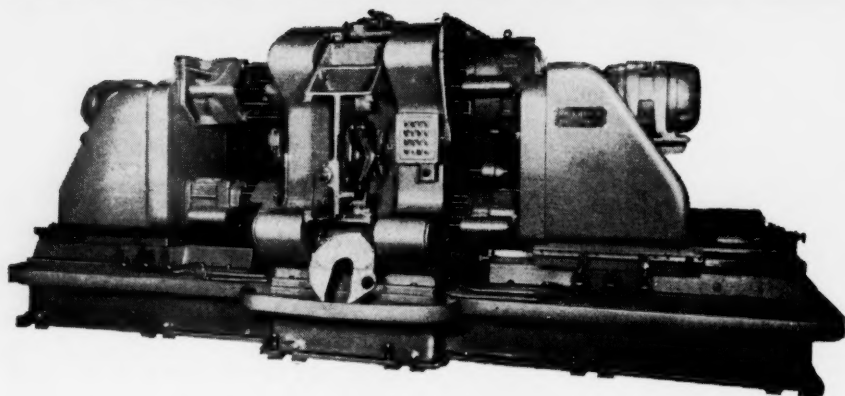
There is nothing
like on-the-job
performance
to prove
Butterfield's
superiority.

BUTTERFIELD

UNION TWIST DRILL COMPANY
BUTTERFIELD DIVISION
DERBY LINE, VERMONT, U. S. A.
TAPS • DIES • DRILLS • REAMERS • COUNTERBORES • SCREW PLATES

FOR BETTER SERVICE
Call Your
BUTTERFIELD
DISTRIBUTOR

SPECIAL DOUBLE-END DRILLING, BORING and TAPPING MACHINE



Illustrated is one of the special machines we are constantly building, in addition to our line of MULTIPLE DRILL HEADS, to meet the specific requirements of plants, large and small. This machine is used for drilling, boring and tapping the adapter plate on an automatic transmission . . . The part is completely bored, drilled and tapped on this machine. We are using two of our Standard HH-20 Horizontal Way Type Units with an Automatic Index . . . The complete cycle is 30 seconds. The part is clamped with hydraulic cylinders.

*We solicit your inquiry as to any special drilling,
milling or boring operations you may have.*



ICHIGAN DRILL HEAD CO.

971 E. EIGHT-MILE ROAD

HAZEL PARK, MICH.

NEW!

**THE
MODERN
TYPE M
STUD SETTER***

***A Better Stud Setter
for
Better Stud Setting!***

**Details on Request*

MODERN TOOL WORKS

DIVISION

CONSOLIDATED MACHINE TOOL CORPORATION

WHOLLY OWNED SUBSIDIARY OF FARREL-BIRMINGHAM COMPANY, INCORPORATED

ROCHESTER, NEW YORK

IT'S NEW! *It's Powerful!*
It's Low Priced!

STONE Model M-35

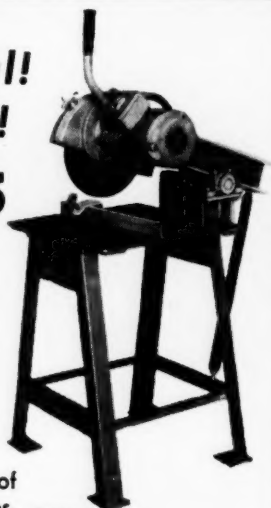
12" Cut-Off Machine

For Ferrous and Non-Ferrous Metals

CAPACITY

Ferrous—1½" solids,
2½" O.D. pipe, 2½" structurals
Non-ferrous—2½" solids,
3" tubing and extrusions

We are proud to present the newest member of our superior line of high speed cut-off machines. The M-35 has a full 3½ h.p. geared-in-head motor. The direct drive insures delivery of full power to the cutting edge. Result — faster cutting (3 seconds per square inch of metal) and greater wheel life.

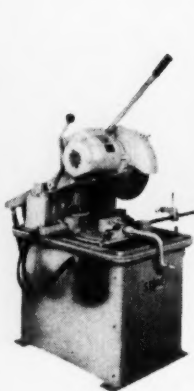


PRICE

Completely Equipped
Ready for Cutting

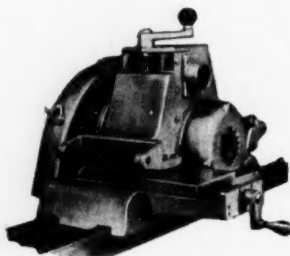
\$445

F.O.B. Syracuse, N. Y.



MODEL M-75

Full 7½ h.p. geared-in-head motor. Will cut all ferrous and non-ferrous solids up to 2½", pipe and structurals up to 4". Can be equipped for wet cutting.

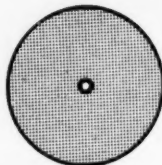


MODEL SS-20

Operates on guided rails for cutting larger structural steel, plate, sheets, with cuts up to nine feet in length. Cuts wet or dry.

STONE ABRASIVE WHEELS

Cut 25% faster — average cutting time is 3 seconds per square inch of metal. Increased wheel life up to 25%. Write for prices.



For complete information write to

STONE MACHINERY Co., Inc.

Fayette St. Manlius, N. Y.

10 reliable Westinghouse Air Compressors help provide steady production flow at BALTIMORE LUGGAGE COMPANY

● Baltimore Luggage Company, Baltimore, Md., lets air do the work on many operations in manufacturing its line of ladies luggage. Ten Westinghouse Air Compressors provide a steady supply of air to pneumatically-controlled equipment.

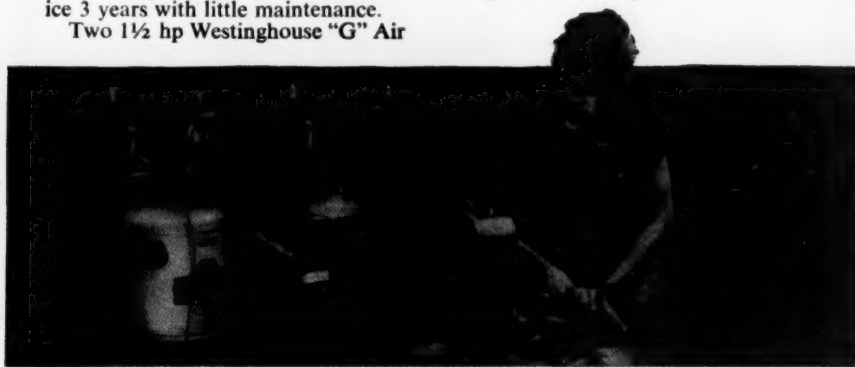
To prolong compressor life and assure uninterrupted production during routine maintenance, Baltimore Luggage has assigned twin units to various jobs, operating them on alternate days. For example, two 5 hp Westinghouse "Y" Air Compressors supply air to three plywood bending machines and three plywood sealing machines which form luggage frames. These compressors have been in service 3 years with little maintenance.

Two 1½ hp Westinghouse "G" Air

Compressors furnish air to pneumatically-operated electronic heat sealers, and two ½ hp "G" Compressors supply air for hand-held staplers. They have operated for periods from 1½ to 2½ years with little maintenance.


Wherever you need air in your plant, you need a Westinghouse Air Compressor with such exclusive long-life features as low oil-level protection, controlled pressure lubrication, thermal overload protection and positive starting unloader.

Ask your Westinghouse Air Compressor dealer to show you the model that fits your air requirements. He's listed in the Classified Section of your telephone directory.



The two Westinghouse "G" Air Compressors in the background supply air for four of these hand-held staplers with which lining is fastened inside the luggage.

Westinghouse Air Brake COMPANY

INDUSTRIAL PRODUCTS DIVISION  WILMERDING, PENNSYLVANIA

Factory Branch: EMERYVILLE, CALIF. Distributors throughout the United States . . . Consult your Classified Directory. Distributed in Canada by: Canadian Westinghouse Co. Ltd., Hamilton, Ontario.

ABRASIVE No. 3B
POWER FEED
SURFACE GRINDER

the
carefully
built grinder



CAREFUL... GRINDER AT WORK!

Good machines are the surest step toward quality output . . . and there's no machine tool that's more careful with your work than the ABRASIVE 3B Surface Grinder.

Thousands of Abrasive 3B Surface Grinders are in use in automotive, airplane engine, and tool plants throughout this country and abroad. Find out for yourself how this fast, accurate surface grinder—with its power table traverse and cross feeds—can help in your plant. Write for descriptive catalog. Abrasive Machine Tool Company, 20 Dunellen Road, East Providence 14, R. I.

ABRASIVE

ACCURACY BOOSTS PRODUCTION

Abrasive Quality is Reflected in the Finish of Your Product

hendey lathes are better built...

FOR LONGER, MORE ACCURATE LIFE!

And here's how it's done — Hendey starts with quality design and follows through with quality workmanship. Take the hardened and precision ground bed ways, for instance. Hendey does this differently *and better!* First, the world's most modern induction hardening equipment uniformly hardens the ways. Next, the precision machined legs and chip pan are attached to the bed (and they are never removed thereafter). Ultra precision grinding follows. Exacting checks for accuracy are then followed by electronic testing for hardness — uniform hardness — there are no soft spots in a Hendey bed — and a customer's test sheet proves it!

Add to this, quiet headstocks, the finest of lead screws, simplified, convenient controls and the ruggedness and power essential for modern precision turning.

Hendey lathes maintain the Hendey tradition for quality and accuracy. And there is the *right* machine in the Hendey line to suit your precision turning requirements. Write for details.

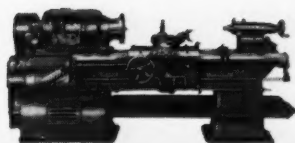


Featuring uniformly hardened and precision ground bed ways.

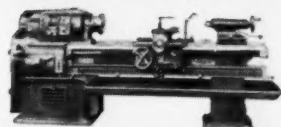


**the Hendey
machine co., inc.**
torrington, conn., u.s.a.
—precision machine tools—

distributors in principal cities



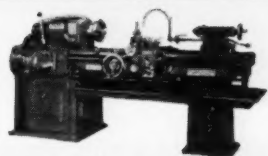
18" — 20" — 24" 12-speed Geared Head Lathes



12" — 14" — 16" 18-speed Geared Head Lathes



12" — 14" — 16" 12-speed Geared Head Lathes



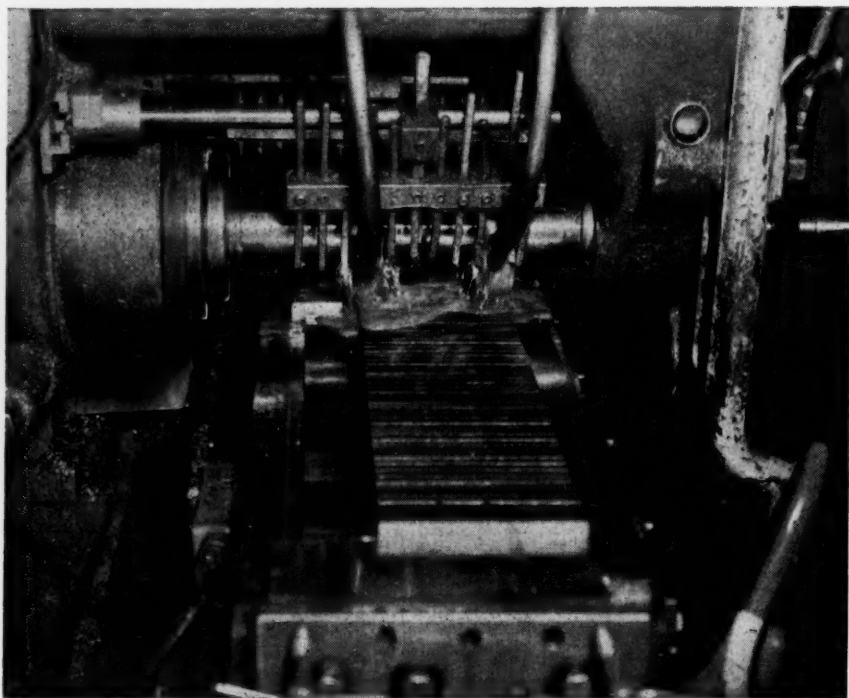
No. 2 General Purpose Lathe



No. 1 General Purpose Lathe



9" x 24" Tool & Gage-Makers' Lathe



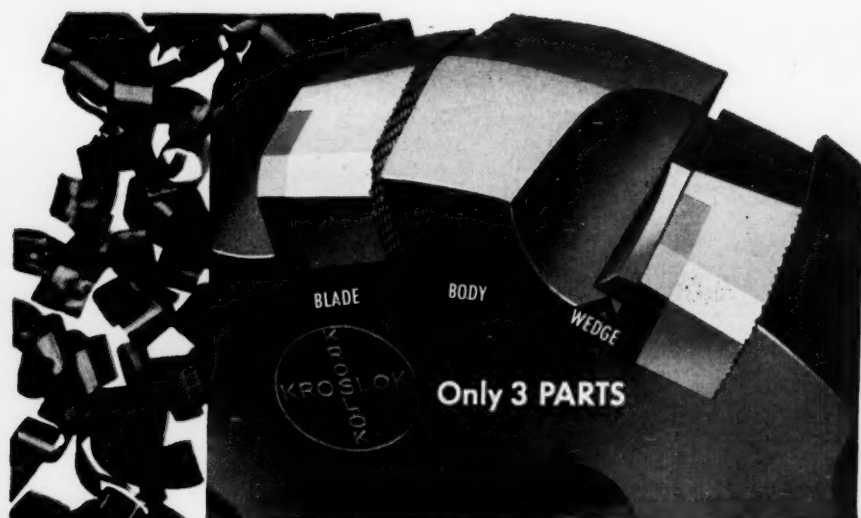
Scientifically established principles of magnetic chuck design—utilizing *balanced polarization* and (most important) control of magnetic motive force away from machine tool tables and spindles, form the basis of successful holding for milling operations. Walker Magnetic Chucks for milling reduce hand time, expedite production, extend cutter life, decrease costs.

O. S. WALKER CO. Inc.

WORCESTER 6, MASSACHUSETTS

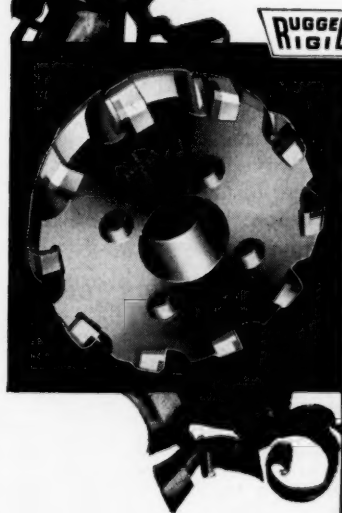
Original Designers and Builders of Magnetic Chucks

In Canada — Upton Bradeen & James, Ltd.



You're "in the Chips"

**WITH THE MOTCH & MERRYWEATHER KROSLOK
FACE MILLING CUTTER AND SHELL END MILL**

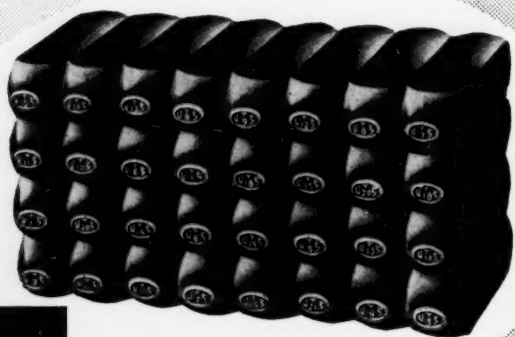


A real blue chip investment — KROSLOK. Be sure of positive blade holding which is obtained by immovable wedges and cross serrations mating between body and blade. Extra rugged construction! Reach new production highs by long, uninterrupted service. Make milling more profitable through higher speeds and heavier feeds. *Only three members!* General purpose and heavy duty bodies, each for ferrous and non-ferrous applications; special KROSLOKS to order.



**THE
MOTCH & MERRYWEATHER
MACHINERY CO.**

Cutting Tool Manufacturing Division
Cleveland 13, Ohio



RETAIN CONTROL

with INSPECTION and CODE STAMPS



These inspection and code stamps enable a manufacturer to retain control of his product wherever it goes. A single glance can provide such information as the identity of a welder, inspector, operator, or assembler—heat number, lot number, material or date of manufacture.

Choose your own code from any of 300 stock designs, available in any desired size, in either the economical HI-DUTY Brand or even longer-lasting HI-LOY Brand. You'll get permanent identification through use of code designs, with key letters or figures if desired.

"IF IT'S WORTH MAKING, IT'S WORTH MARKING"...



Geo. T. Schmidt marking engineers will help you develop a code control plan without obligation. Write for particulars.

GEO. T. SCHMIDT, INC.

1806 West Belle Plaine Avenue

Chicago 13, Illinois

LOW RAKE means . . .



LESS

TWIST

Excessive bending during cutting is the major cause of twist in pieces sheared. There is a direct relation between bending and the rake or shear angle of the upper knife. A high rake bends a piece **MORE** than a low rake because a **SHORTER** section of the stock is under pressure during cutting.

CAMBER

Departure of the edges of a strip from a straight line is called camber. An important factor in causing camber is high rake which tends to rotate a sheet during cutting.

BOW

Bow is deformation in a direction perpendicular to the surface of a strip. Here again experience shows that low rake gives the best results.



WHEN CUTTING WITH STEELWELD SHEARS

MORE is required of a shear than the power to cut, to achieve precision shearing. A great deal depends on how the cut is made if parts cut are going to fit accurately without additional work.

For this reason rake, or knife shear angle has been made very low on all Steelweld Shears. This of course requires more driving power and consequently a larger driving motor and heavier construction

throughout than would be necessary with a higher rake. But it minimizes twist, camber and bow in pieces cut.

Because of low rake and also because of the ease with which knife clearance is adjusted to suit every plate thickness, cuts made on Steelweld shears are unusually smooth, straight and true.



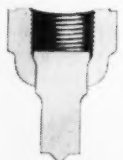
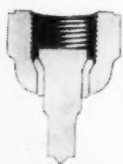
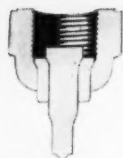
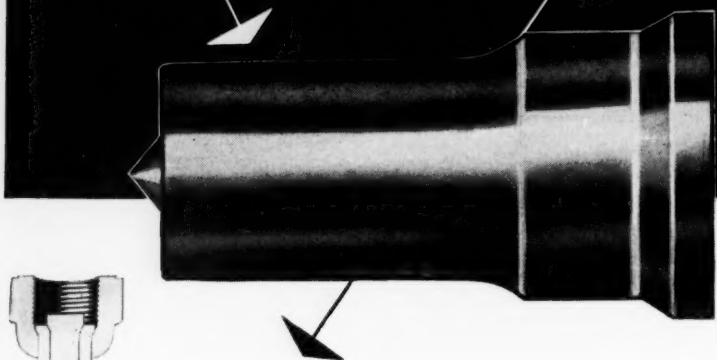
GET THIS BOOK!

CATALOG No. 2011 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.
6404 East 282nd St. Wickliffe, Ohio

STEELWELD PIVOTED BLADE SHEARS

..... cut punch *Costs*
standardize on CLEVELANDS!



You both speed production and cut costs when you adapt your punching machines to use standard tools. With the Cleveland System of Standardization the *same* coupling nut and punch stem holds a wide range of punch sizes. As shown here, sleeves are used to adapt the smaller punches of any series to the coupling nut. For instance, by the use of but two sleeves, you punch holes ranging from $\frac{1}{8}$ " to $1\frac{1}{16}$ " inclusive without changing nut or punch stem. This greatly reduces tool set-up time without reducing flexibility of operation.

Standard Cleveland punches cost less. There is no stock waste in production. Smaller sizes are made from smaller stock. They are made in quantity runs and shipped from inventory.

A-7266

THE CLEVELAND
PUNCH & SHEAR WORKS CO.
 U.S.A.

Established 1880

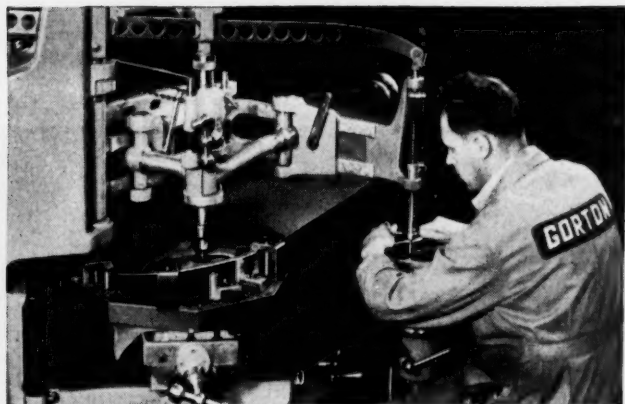
..... POWER PRESSES

PUNCHING TOOLS & DIES

OFFICES AT:
 NEW YORK... CHICAGO
 DETROIT... PHILADELPHIA
 S. LANSING

FABRICATING TOOLS

CLEVELAND 14, OHIO



Gorton Pantograph Does Job 7 Times Faster

In only 40 minutes this tracer-controlled pantograph cuts and blends a thermal slot in an 8-foot steel propeller blade — a job that requires 5 hours 10 minutes by other methods. This is typical Pantograph performance—one of hundreds of examples.

Gorton *Pantography* Brings Creative Production to Your Plant

What's *your* problem in machining? Depend on Gorton Pantography to help you *create* a new production method if your problem falls into any of these categories:

OPERATIONS

Inside profiling
Outside profiling
Routing
Die sinking

Mold cutting
Counterboring
Contour Milling
Chamfering

Grooving
Graduating
Engraving

Gorton Pantography works in two or three dimensions, in all directions, horizontally *and* vertically on ferrous or non-ferrous metals or in plastics. Easily made, inexpensive enlarged masters are employed and work is done at a reduction ratio which increases accuracy — an exclusive pantograph benefit.

Whether a dozen or a thousand pieces, each is identical in shape and tolerances to the first. Operation during cutting cycle is manual or automatic, and work piece size varies from the diameter of a dime to areas as large as ten feet.

Clip the coupon for your copies of the Gorton catalog and the helpful booklet, "Pantography."



Please send at once complete information about the Gorton line contained in Bulletin 1655-1702.

Firm.....

Name.....

Title.....

Address.....

City, State.....

1702 Racine St., Racine, Wis., U.S.A.

A 7787-1P-A

MODERN MACHINE SHOP 97

Operators do better on a J&L turret lathe



J&L TURRET LATHES GIVE

MORE Ease of Operation
MORE Power Transmission
MORE Rigidity
MORE Accurate Stops
MORE Efficient Lubrication
MORE Coolant on Cutting Tools
MORE Accurate Results

This conveniently located single lever enables an operator to select from twelve different spindle speeds, forward or reverse, and to pre-select speed for the *next* cut while the machine is in operation. The same type of single-lever control is also supplied for both the saddle and carriage feeds.

This is only *one* of the many important features that are built into J&L Turret Lathes so that operators can turn out *better* work *faster*, with minimum fatigue.



Two speed ranges — 30 to 1500 R.P.M., and 20 to 1000 R.P.M. — with a constant speed motor, are available on all J&L Ram Type machines, except the S-4½, which has speed range of 15 to 750 R.P.M. or 20 to 1000 R.P.M.



JONES & LAMSON

*Machine Tool Craftsmen
Since 1835*

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TURRET LATHE DIV.

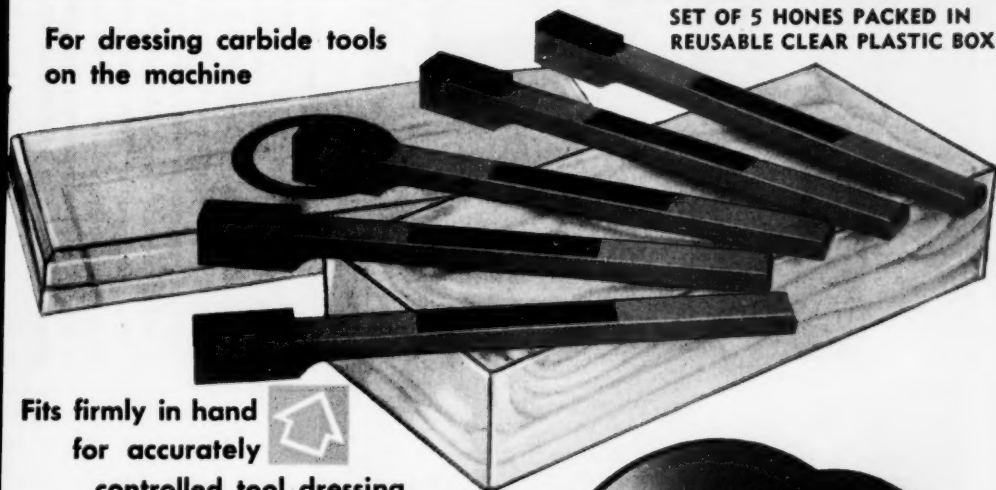
20% LONGER TOOL LIFE BETWEEN REGRINDS

Diamond
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For dressing carbide tools
on the machine

SET OF 5 HONES PACKED IN
REUSABLE CLEAR PLASTIC BOX



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for accurately
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for all general shop requirements

SINGLE END.....

SET #1010 5 Hones, Assorted Grits \$73.50 per set

complete range for all tool cutter finishing

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United States Diamond Wheels are famous throughout industry . . . they are the world's finest wheels for production tool maintenance. Extra-long, high performance. Rapid stock removal. Perfect "spark-out" on large diameter cutters.

Send for catalog showing complete line of products . . .

UNITED STATES DIAMOND WHEEL CO. AURORA, ILLINOIS



PUNCHING 1/8", 1/4"

AND 3/4" THICK METAL



standardize on

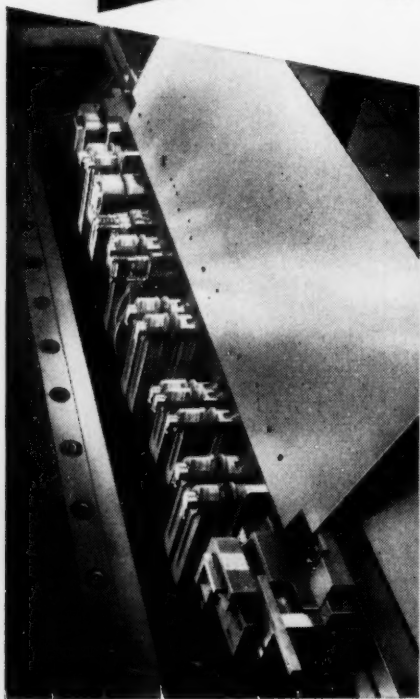
WALES

Hole Punching Units

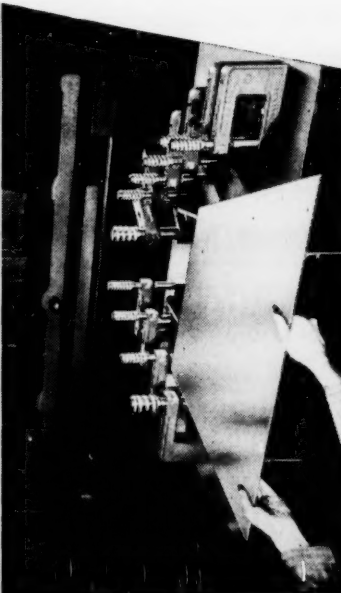
Only Wales Hole Punching and Notching Units provide the numerous *patented features* plus the *time and cost saving advantages* that have made it "standard practice" with thousands of metal fabricators to *standardize* on this *exclusive equipment*.

Wales independent, self-contained Units eliminate costly, single-purpose custom dies, reduce expensive setup time and practically eliminate press "downtime."

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Showing Wales Type "BL" Hole Punching and Type "N" Notching Units in a combination press brake setup for punching and notching mild steel up to 1/8" THICK.



A stamping press setup of Wales Type "CJ" Hole Punching Units for punching mild steel up to 1/4" THICK.

The multiple advantages of Wales Hole Punching and Notching Equipment are too MANY to tell here, so write for fully-illustrated, functionally colored catalogs TODAY.

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George F. Wales, Chairman

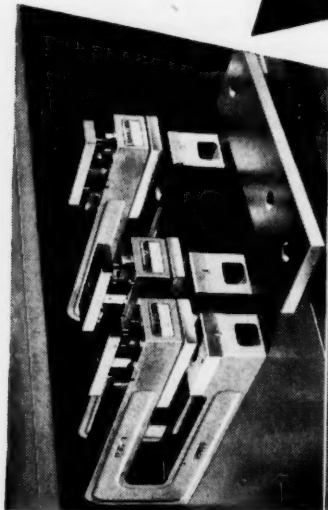
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(Between Buffalo and Niagara Falls)

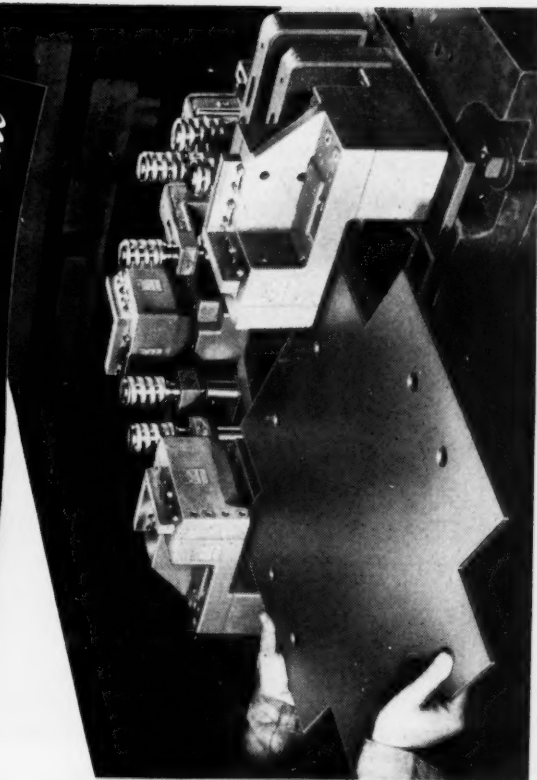
Wales-Strippit of Canada, Ltd., Hamilton, Ontario

Specialists in Punching and Notching Equipment

also notching up to 1/4" thick metal



Showing a setup of Wales Type "HS" Hole Punching Units in a press brake for punching mild steel up to 3/4" THICK.



Showing a setup of Wales Type "NJ" Notching Units in a stamping press for notching mild steel up to 1/4" THICK.



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to Get Results!



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Torit also manufactures a line of cyclone type dust separators. Sizes up to 5 H. P., with or without after filters.

Almost hidden by this thread grinding machine is a Torit No. 64 Dust Collector. Note the minimum of piping and how the dust nozzle nestles just below the work—out of the way yet close enough to capture every dust particle.

Torit Dust Collectors possess many advantages. Compact and self contained they fit in most anywhere, with a minimum of installation expense. Piping losses are reduced and, wired through machine starters, so are power demands. Their rugged construction insures long life and easy maintenance.

There are Torit Dust Collectors for every standard dust problem, and adaptations for unusual requirements can be quickly designed and fabricated. For complete information and the latest Torit Catalog write:

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hard-to-get-at
jobs?

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No heavy, bulky motor to handle! You'll have positive control of the operation because you hold only the handpiece, not the heavy, bulky motor. Less operator fatigue, higher production, fewer rejects.

Wide range of uses! Grind, Rotary File, Brush or Drill merely by changing the tool. And with the new Strand Quick Change Handpiece you can change tools in seconds without using wrenches, tools or special equipment. Simple press-type locking button does the trick!

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SHAFT
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drive belts by the patented Strand Gear Drive unit standard on all *Strandflex* machines. And, for an even wider range of speeds you can use the sensational new Strand High Speed Handpiece that actually triples spindle speeds! Lets you work at up to 27,000 R.P.M.'s for high speed steel or carbide cutters.

GET THE FULL STORY NOW! Write for Catalog 331-A or see your dealer for information. Full Strand line includes direct drive and countershaft machines up to 3 HP and *Strandflex* units up to 1 HP. Also complete line of accessories and attachments.



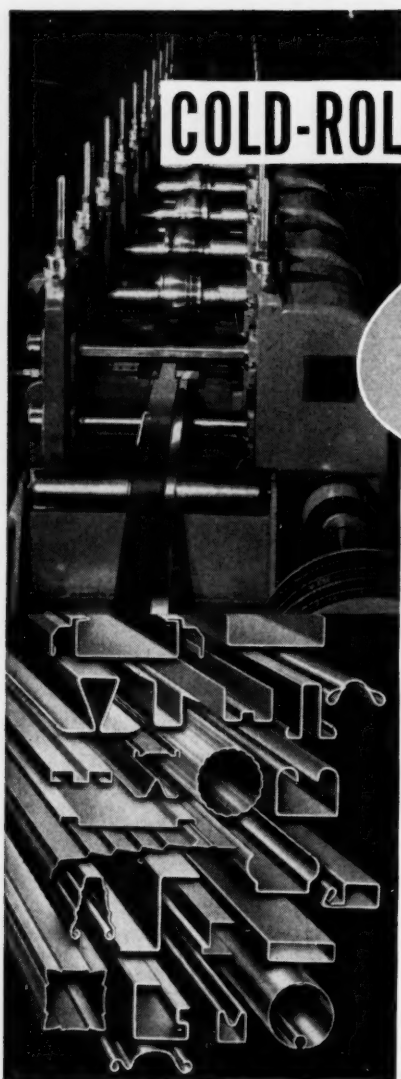
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New applications are constantly being discovered. Total production of Yoder cold roll forming machines now runs into billions of feet annually.

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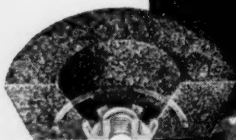
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February, 1954

MODERN MACHINE SHOP 107

You can also

"ROLL YOUR OWN" TO SAVE MONEY ON SHAPES*



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against web



ANGLES
both legs in



ANGLES
leg in



ANGLES
leg out



TEES
on flange



BARs
on flat



BARs
—on edge



ROUND BARs
spiral



RACK
teeth out



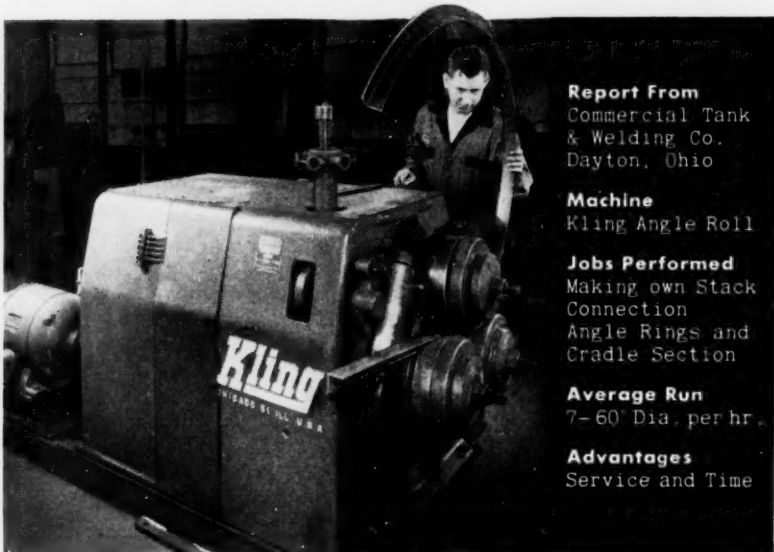
CHANNELs
against web



CHANNELs
leg in—leg out



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ball out



Report From
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Jobs Performed
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Cradle Section

Average Run
7-60" Dia. per hr.

Advantages
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*At the side are shown some of the various
Shapes you can roll with with Kling Angle
Bending Rolls

Kling **ANGLE BENDING ROLLS**

are used in the "BEST OF COMPANIES!"*—to cut production costs

Are you paying big prices for formed structural shapes and curved reinforcements like those illustrated? Then investigate the savings you can make by "rolling your own" on Kling Angle Bending Rolls. With these rolls you can also make your own gear blanks, motor housings, wheels, and many other machinery parts.

Kling Angle Bending Rolls are extra heavy construction; hand or power adjustment; designed to handle both angle and flat bars and can

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For detailed description of Kling Angle Rolls send for Bulletin 600.

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...an investment in speed!



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Double Angle Shears



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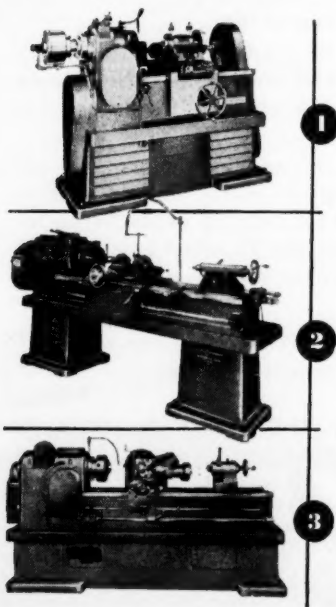
Punches



Friction Saw

***If it has to be
precision **THREADED**
...a COULTER will
do it faster, more
accurately!***

With a reliable COULTER Automatic Threading Machine on your line, you will hold your share of today's speed-up-of-production demands! You will thread parts in a greater variety of lengths and diameters with diverse materials to more accurate specifications and far better quality than with any other threading machine built . . . and everything is automatic!



3 models for

Varying Threading Operations:

- 1** "H1" Hob Thread Milling Machine
... for precision, internal and external threads . . . **AUTOMATICALLY.**
- 2** "L1" Threading Lathe
... for precision, square, standard and 29 degree threads . . . **AUTOMATICALLY.**
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... for precision, long and short traversing, elevating, cross feed and lead screws . . . **AUTOMATICALLY.**

If you are planning to purchase a threading machine, it will pay you to look into the COULTER line. We welcome opportunities to discuss your threading problems and quote on equipment engineered to your special requirements.

Machine Tool Builders Since 1896

**The James
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641 Railroad Ave. Bridgeport 5, Conn.



The **Complete** **LOVEJOY LINE** **of Modern Metal** **Cutting Tools**

The Lovejoy line of inserted-tooth type cutting tools has never been more complete — or offered so many features. Every tool has been designed to give maximum production with a minimum of down time for sharpening. Lovejoy tools feature the exclusive "Positive-Locking" device that assures rigidity even during heavy intermittent cuts — making them rugged as solid tools. Their housings — of husky forged steel — are designed for longest life.

Lovejoy H. S. S., Carbide and Cast Alloy Blades are interchangeable in the same housing and are stocked for immediate shipment.

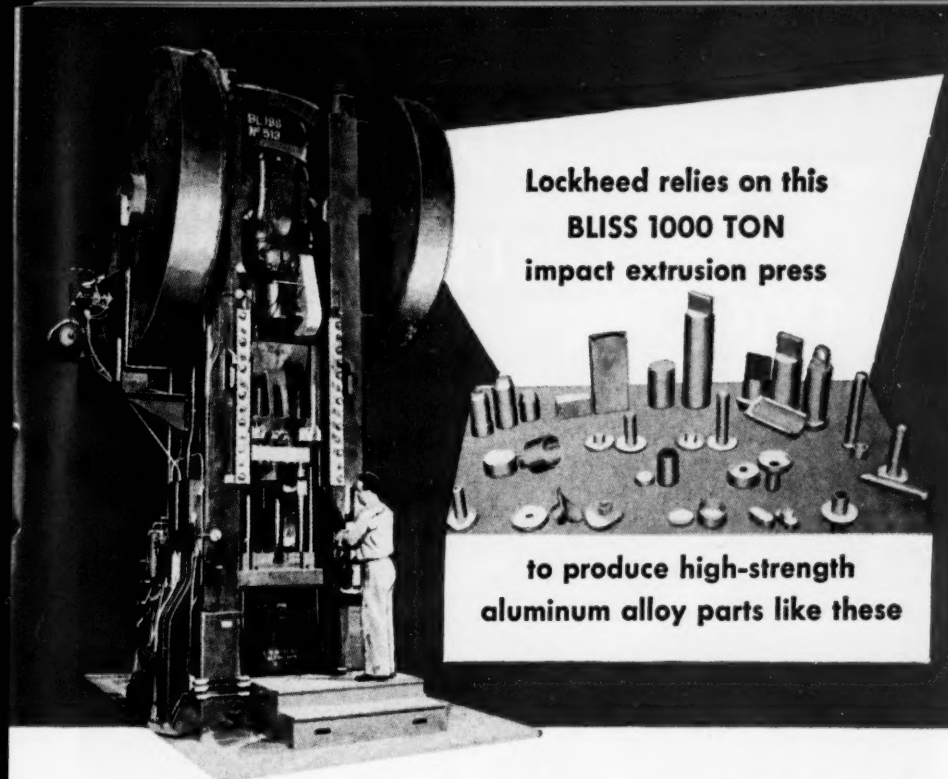
For standard or special cutters, call on Lovejoy — suppliers to the world's leading manufacturers for over 35 years. Write today for Catalog No. 28 which describes the full line of Lovejoy tools.

"Speed & Feed Calculator"
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LOVEJOY **TOOL COMPANY, INC.**



**Lockheed relies on this
BLISS 1000 TON
impact extrusion press**

**to produce high-strength
aluminum alloy parts like these**

and saves thousands over conventional machining methods

This press, largest of its kind in the aircraft industry, has saved Lockheed up to 75% in time as compared to machining, and up to 90% in material.

In fact, Lockheed engineers estimate that transfer of only 15 parts from conventional machining to impact extrusion will mean savings of \$52,000 a year.

Lockheed's experience proves the importance of picking the right press for the job. And we honestly believe that our engineers are best equipped to help

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If you have a press problem—from a single press to an entire press room—consult a Bliss engineer or write directly to address below.

BLISS

on your press is more than a name... it's a guarantee

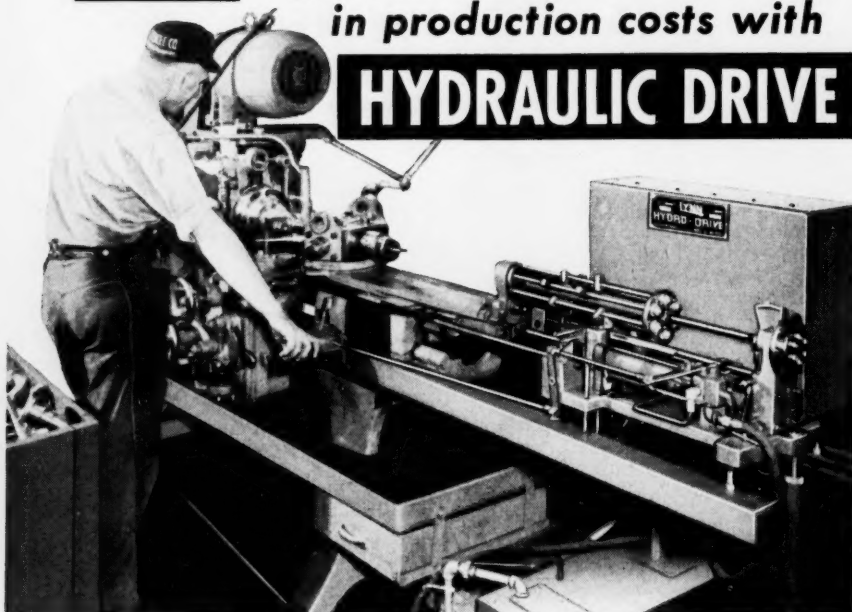
**Canton, Ohio
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HYDRAULIC DRIVE



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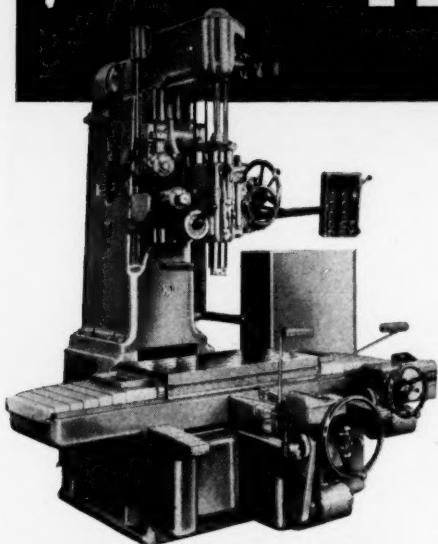
20% saving in production costs is especially necessary on competitive long-run jobs, where profit margins are tight and chances for loss are many. Lynn Hydraulic Drives have produced this saving in every installation made in the past seven years.

Demonstration and Installation

In most areas, personal demonstrations are available. Every installation is made by Lynn factory engineers. They stay on the job until your operators are expert in every phase of Hydraulic Drive operation—so that they can easily cut a minimum of 20% off present production costs.

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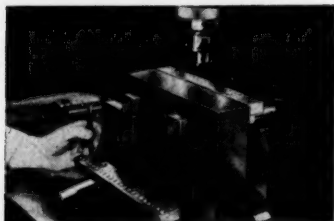
NOW THE NEW PRATT & WHITNEY No. 2E *Electrolimit* JIG BORER



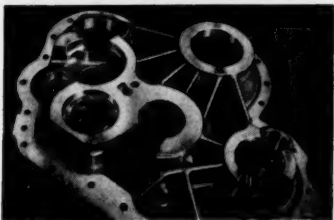
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- THE NEW *Electrolimit* MEASURING SYSTEM locates the table fast, accurately, and easily; holds wear to a minimum.
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- AMPLE CAPACITY—Table 22" x 44"; longitudinal travel 36"; transverse travel 22"; table to spindle 27"; special columns 6" and 10" higher also available.

DO JOBS LIKE THESE ON YOUR 2E



Put a 2E to work for you and you've got the practical size for the average toolroom. Also available smaller No. 1E, and the big No. 4E. On the way No. 3E . . . and still available, of course, the famous line of P&W End Measure type Jig Borers.



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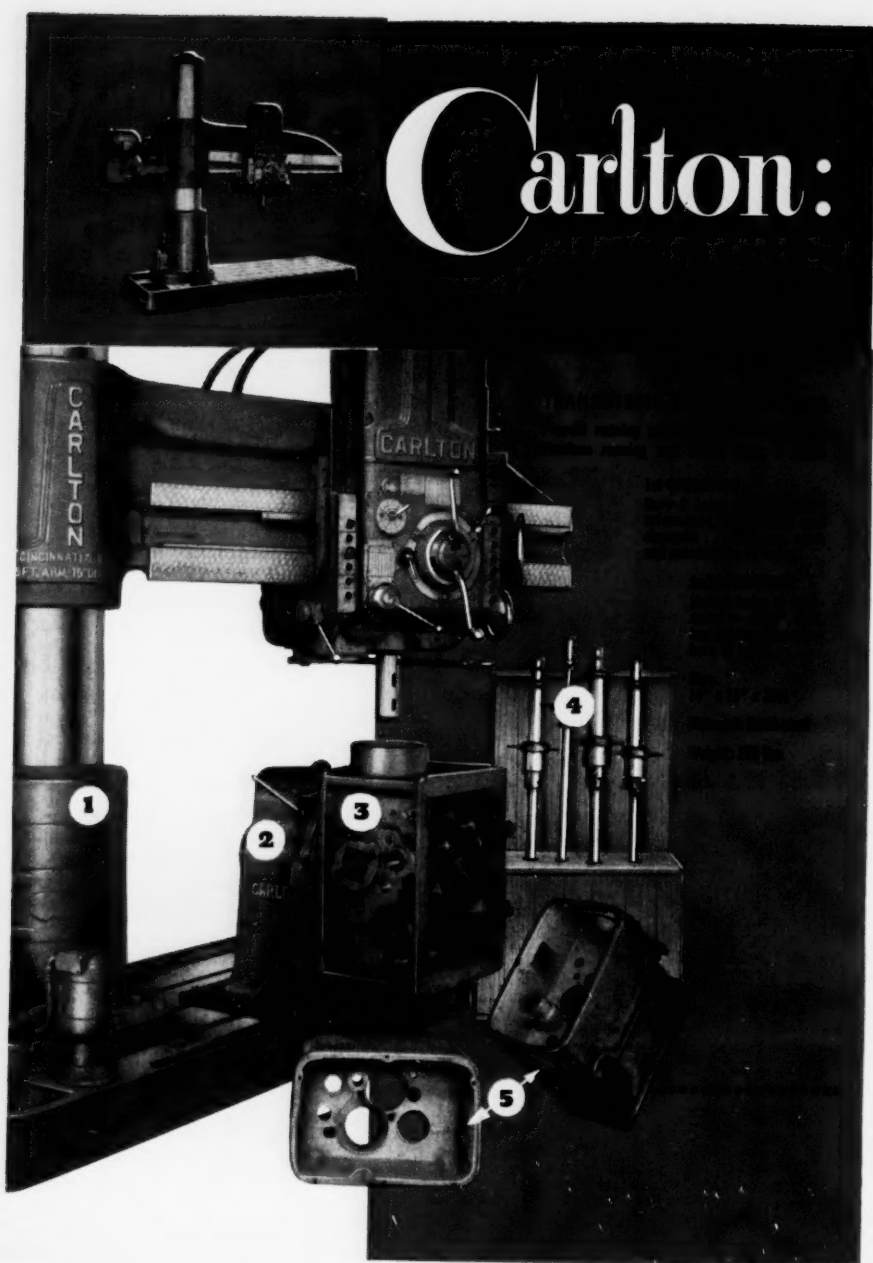
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Carlton:

THE PRODUCTION RADIAL DRILL

Carlton radial drills, properly tooled,
will lower costs over the horizontal method

Drilling and boring accurately located holes isn't usually considered a production operation for a radial drill. However, when fitted with master trunnion and appropriate jigs, Carlton radial drills do this work accurately, quickly and on a production basis!

The transmission body shown here is a perfect example of production hole drilling on a Carlton. Using this set-up, many more operations are performed in the Carlton radial drill . . . at a terrific saving in handling and running time over the previous method.

Previously the transmission body was processed with the horizontal boring method included. The new tooling set-up worked out by Carlton engineers effected a 25% savings by circumventing the boring operation previously done in a horizontal plane. Using the horizontal method, the transmission body had to be handled four times . . . now it's handled but twice!

And Carlton radial drills are perfectly suited to production drilling. The push-button control simplifies and speeds up

operation. The low hung drive assures the necessary rigidity. And the accuracy and precision with which the Carlton column clamp performs eliminates the need for operator to clamp and unclamp the column until the boring bar moves freely in the pilot bushings, thus assuring long life to boring bar and pilot bushings.

Carlton engineers will be glad to work with your engineers in recommending the most efficient tooling for your Carlton radial drill . . . to show you how the radial drill can be a real production machine tool, particularly if it's a

Carlton

THE CARLTON MACHINE TOOL CO.
Cincinnati 25, Ohio, U. S. A.

CARLTON ENGINEERED TOOLING SET-UP

- 
- 1 Carlton 3-A radial drill
 - 2 Master trunnion
 - 3 Jig
 - 4 Boring bars
 - 5 Transmission body casting

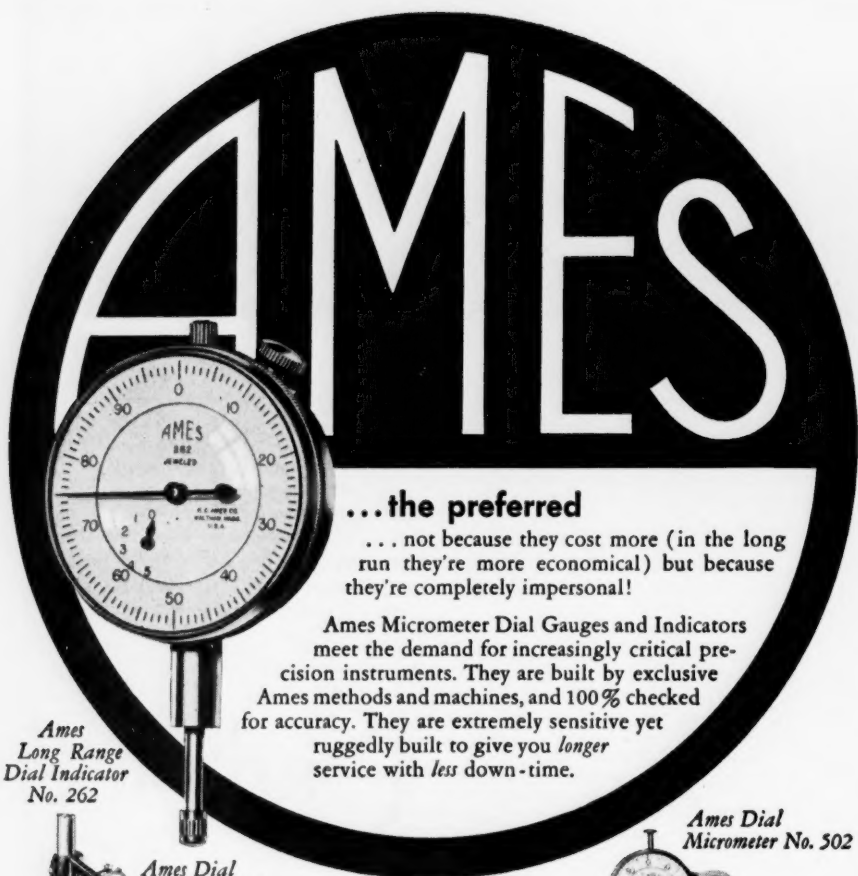
Gentlemen:

Have your representative call and show us that
Carlton is the *production* radial drill.

Name _____

Company _____

City _____ Zone _____ State _____

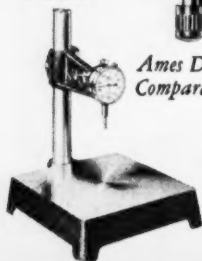


...the preferred

... not because they cost more (in the long run they're more economical) but because they're completely impersonal!

Ames Micrometer Dial Gauges and Indicators meet the demand for increasingly critical precision instruments. They are built by exclusive Ames methods and machines, and 100% checked for accuracy. They are extremely sensitive yet ruggedly built to give you *longer* service with *less* down-time.

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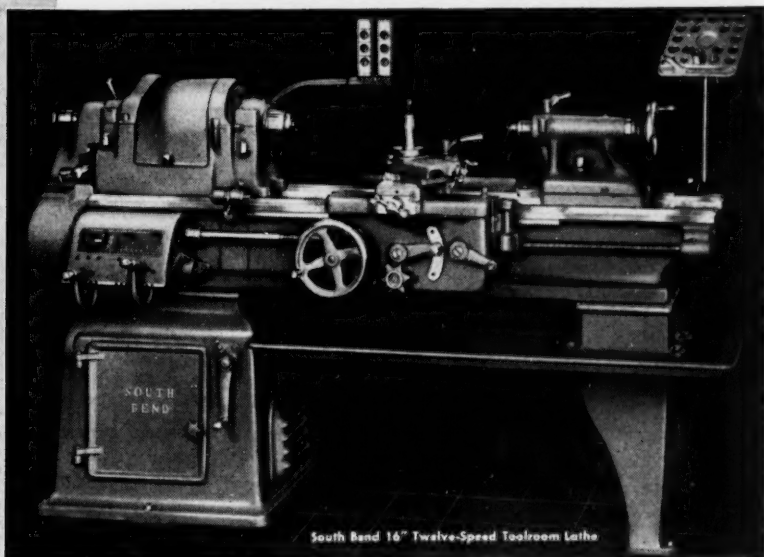
Mfg. of Micrometer Dial Gauges • Micrometer Dial Indicators

Cuts Machining Time

The wide range of spindle speeds on this new lathe cuts machining time because the operator quickly selects the right speed for each operation. Pushbutton control provides a fast change from any high speed to the corresponding low speed. This versatility is further increased by 48 choices of longitudi-

SOUTH BEND 12 SPEED LATHE

inal and cross feeds which insure maximum efficiency on every job. CL8155C, illustrated below, \$2690.00 f.o.b. factory, less motor and controls. Time payment terms: 10% down, balance 12 or 18 months.



South Bend 16" Twelve-Speed Toolroom Lathe

SPECIFICATIONS

Spindle Speeds (approx.) Direct: high range 300, 550, 945; low range 150, 278, 475. Back gear drive: high range 32, 70, 118; low range 20, 33, 60.
Spindle Bore — 1 3/8".
Swing over bed and saddle wings — 16 1/4".
Swing over saddle cross slide — 9 5/8".

Distance between centers — 33 1/4", 45 1/4", 57 1/4", 81 1/4", 105 1/4".

Collet Capacity — 1" maximum.

Longitudinal Feeds — 48 R.H. or L.H., .0015" to .0841".

Cross Feeds — 48, .0006" to .0315".

Thread Pitches — 48, 4 to 224 per inch.



Can I get it?
When? How?

Yes—you can get most any South Bend product immediately from our distributor's stocks in principal cities. Items not stocked, shipped promptly from factory.

Three ways to order:

1. See or telephone nearest distributor.
2. Order by mail from your distributor.
3. If no distributor is nearby, order direct from factory.

South Bend machine tools with accessories may be purchased on convenient terms up to 12 months.

SEND INFORMATION CHECKED:

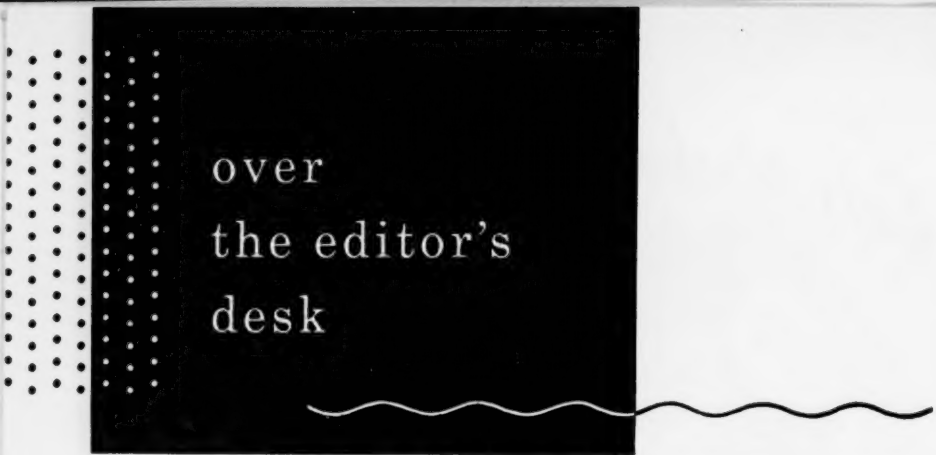
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| <input type="checkbox"/> 4" and 10" BENCH LATHES | <input type="checkbox"/> 10" to 16-24" FLOOR LATHES | <input type="checkbox"/> DRILL PRESSES | <input type="checkbox"/> TOOL GRINDERS | <input type="checkbox"/> 1/2" & 1" Collet TURRET LATHES | <input type="checkbox"/> 7" BENCH SHAPERS |

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over the editor's desk

Background

WE ONCE read somewhere that before the famous Marx brothers ever got down to the serious business of making a movie, they would gather their material together, hit the road, and put on their performances before live audiences in order to determine the merits of their collection of humorous gags and gimmicks. The material which provoked the most favorable audience reaction was then selected for incorporation into one of their movies. Likewise, many a Broadway hit has been performed before a select audience whose critical comments following the performance have helped the producer in his selection of the best material for use in the regular run performance.

The thought occurred to us that many of you readers would be interested in the fact that many of the articles which we select for publication frequently have been "previewed" by some group vitally interested in the subject matter. The comments and criticisms forthcoming from such previews are then used by the author as a guide in the preparation of his article for publication.

One good case in point is that pertaining to the current two-part article entitled *Machined Parts and Their Dimensional Control in Heat Treatment* by Howard E. Boyer, Chief Metallurgist of American Bosch Corporation. In the letter which

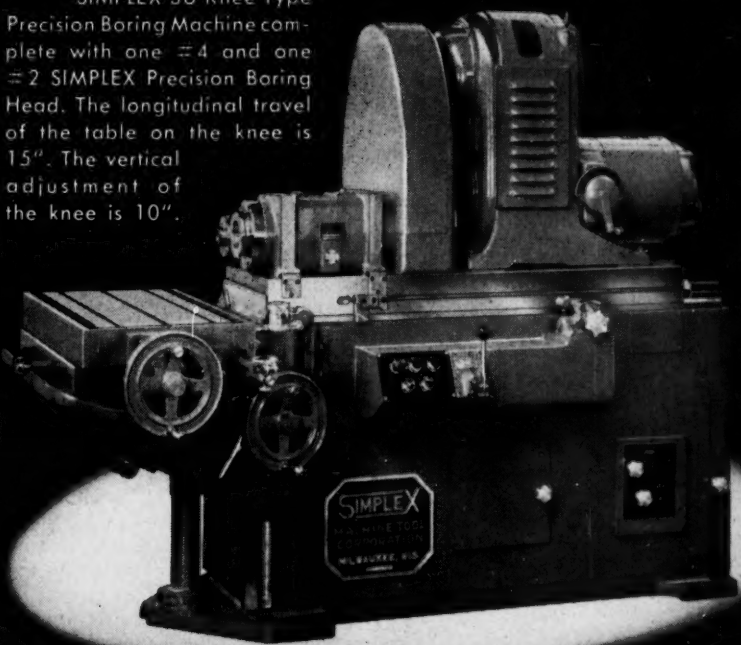
accompanied his manuscript, Mr. Boyer wrote, "I have delivered the essential information contained in this manuscript in the form of lectures on several occasions before American Society for Metals and American Society of Tool Engineer groups in different geographical locations.

"Some new concepts are introduced in this paper which have been received with a great deal of interest by these technical groups. The main part of the theme I am trying to get across is that a great deal can be accomplished in dimensional control through heat treatment if there is sufficient cooperation among the various departments. It just isn't a 'one man show.' The information is presented exactly as I have found it in the course of a great deal of research work, though it is admitted that there is a lot we don't know and cannot account for. The experience gained in presenting the information in lecture form, with verbal discussion interspersed, prompted me to simplify the explanations involving physical metallurgy so that it can be understood and put to practical use by the greatest number of readers."

We think that it is safe to conclude that the reader of the feature editorial articles benefits not only from the sole experience of the author but also from the experience of the many people with whom he discusses his subject material prior to publication. We also think that Mr. Boyer's article will help you to do your job just a little bit better.

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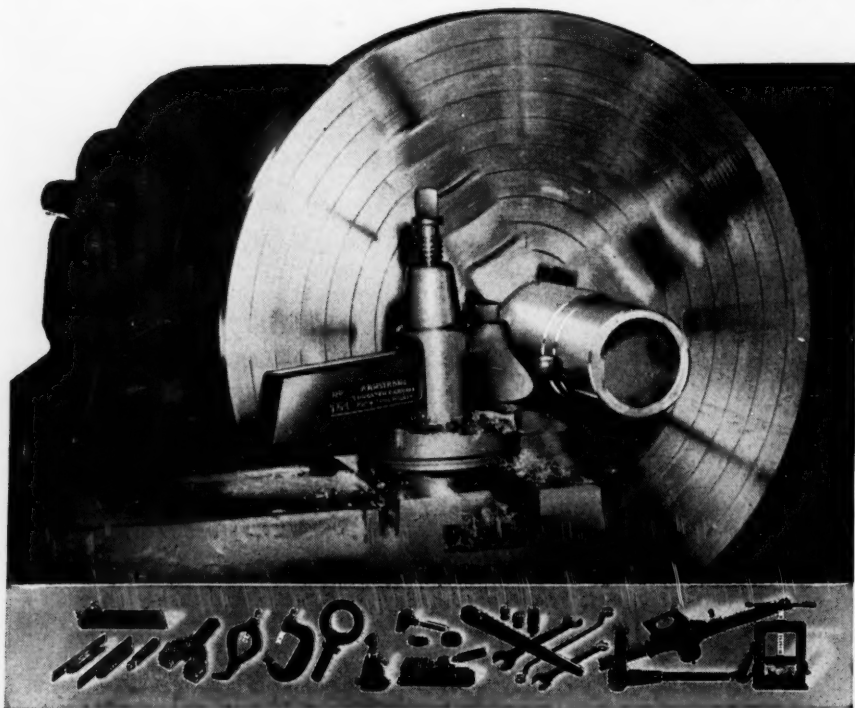
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MODERN Machine Shop

Vol. 26, No. 9
FEBRUARY, 1954

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Machined Parts and Their Dimensional Control in Heat Treatment, Part II

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Noise As An Accident Hazard

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A brief summary of the discussions held at recent Safety Congress relative to the effect of noises on the efficiency, health and safety of industrial workers. Page 162.

Set-Up Slugs Expedite Tooling for Automatics

By B. G. Lawrence

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Huge Casting Repaired by SIGMA Welding Process

By E. R. Stanson

The author describes an interesting application of the shielded inert gas metal arc welding process in repairing a 6,500-lb. aluminum casting. Page 194.

Mass Producing Precision Work

By H. W. SNOOK*

The layout employed in the new machine shop of the El Segundo Division of Douglas Aircraft in mass producing parts for Navy airplanes of different sizes and types to high precision is discussed.

WHEN describing a new airplane, usually only those design features which make it different from, or better than, other airplanes of a similar type are discussed. The same technique can be employed to describe the machine shop recently installed in the new B-6 location of the El Segundo Division of Douglas Aircraft Company at Torrance, California. This new plant, already one of the largest facilities of its type in the nation, is specifically tooled to mass produce Navy airplanes of different sizes and types, and in sufficient number to add substantial marrow to the backbone of our nation's sea power.

In overall perspective, the new machine shop is a high production department, designed and laid out to mass produce high-precision machined parts for aircraft installation. But in detailed analysis, this shop incorporates many "design features" which set it apart from other shops and which enable it to attain that difficult goal of "mass produced precision."

In setting up the new shop, Douglas engineers were extremely fortunate in having a tremendous backlog of experience to draw from—experience gathered over a period of years in the huge, well-equipped shops at the home plant of the El Segundo Division. It was thus possible to select or reject many ideas according to their proven value. But perhaps more important, it was possible to put into effect for the first time many ideas which, while formulated prior to the development of the new location, had not as yet been put into practice at the home plant.

Because so many of the ideas incorporated in the new shop were entirely new in machine shop layout, tooling and operation, and because these ideas were carefully blended to promote production speed and precision simultaneously, it might be said that a sort of "philosophy" was used in setting up the new facility. Every idea had to correspond with and contribute to this philosophy or it was summarily rejected.

Basically, the philosophy was this: Make the new machine shop entirely independent of other plant facilities—so independent, in fact,

* Assistant Superintendent of Fabrication, El Segundo Division (Torrance Plant), Douglas Aircraft Company.

that it could be plucked up and set apart in another location and continue to operate without major inconveniences. Maintain straight-line production flow from raw stock storage through to the finished part. Leave room for expansion without rearrangement every time a new machine was added. Build for the future by overpowering machines where more power might be needed and by installing oversize machines where larger machines might be needed. Minimize paper work. Make the machine shop a pleasant place to work.

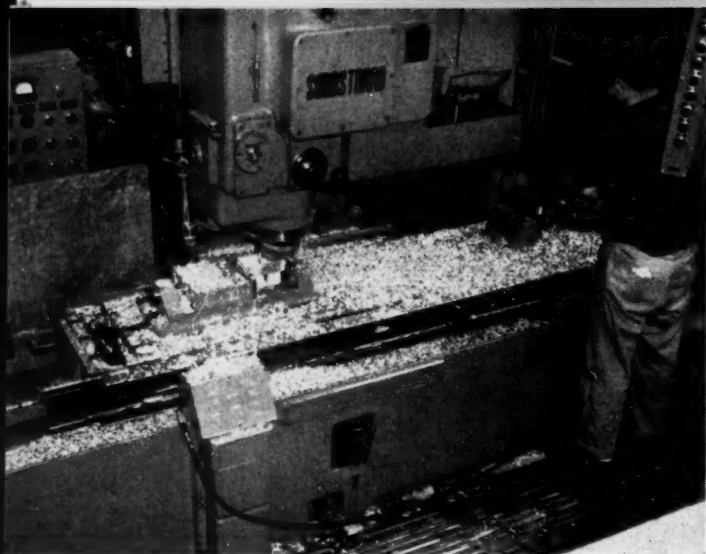
Achieving this multiple-faceted goal was not easy. But the results obtained in the first few months of operation have already justified the work and initial costs. Production

has been upped all the way from 20 to 50 per cent in many shop departments. New equipment, never before used by Douglas in aircraft production, is blending nicely into the picture. Elimination of much paper work is minimizing rather than causing errors. The philosophy that a machine shop will be more efficient if it is entirely self-sufficient and not dependent on other plant departments has proved sound and practical.

This self-sufficiency was perhaps the most outstanding innovation in the new shop setup. It means exactly what the term "self-sufficient" implies. The new B-6 machine shop is provided with complete heat treating facilities, chromium and cad-

General view of the new Douglas machine shop at Torrance, California. Note apparent roominess, wide aisles, and that all machines are located vertical to rather than at an angle with the aisle.





Double fixture installation on a Sundstrand mill. The operator loads one fixture while the part in the other fixture is being machined. In many cases, this double fixturing feature has increased production over 75 per cent.

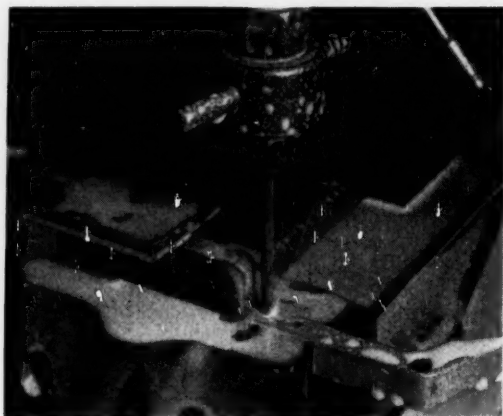
sand blasting, painting, or inspection. In effect, the new machine shop is a factory within a factory, turn-

mium plating facilities, sand blasting equipment, liquid honing equipment, a paint booth, an anodic bath treatment for aluminum, treating baths for hydraulic fluid lines, and other minor processing equipment that is usually located in separate plant departments. This equipment is all "machine shop size", scaled to meet machine shop requirements only, and is not concerned with the same operations elsewhere in the plant.

Complete in-process and final inspection is accomplished entirely within the machine shop. When a part is finished, it is ready for installment on the airplane. It need not go elsewhere for heat treatment,

ing out ready-made aircraft components and delivering them to an assembly department much as they would arrive from an outside and independent sub-contractor. Even the raw material comes from a decentralized portion of raw stock storage where only machine shop raw stock is stored.

One of the great advantages of this self-sufficiency is the time and confusion saved by not having to



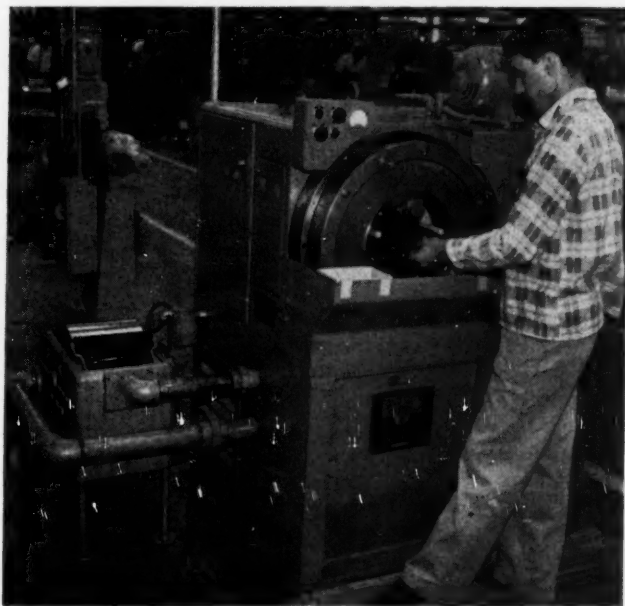
A metal disintegrating electronic drill in action. Purchased for prototype work only, the electronic drill proved efficient enough to take its place on the production line.

transport machine shop work to and from outside departments for various processing. This also eliminates much paper work. Rush jobs can be routed through the machine shop, receiving proper processing as they go, and without awaiting the convenience of outside departments.

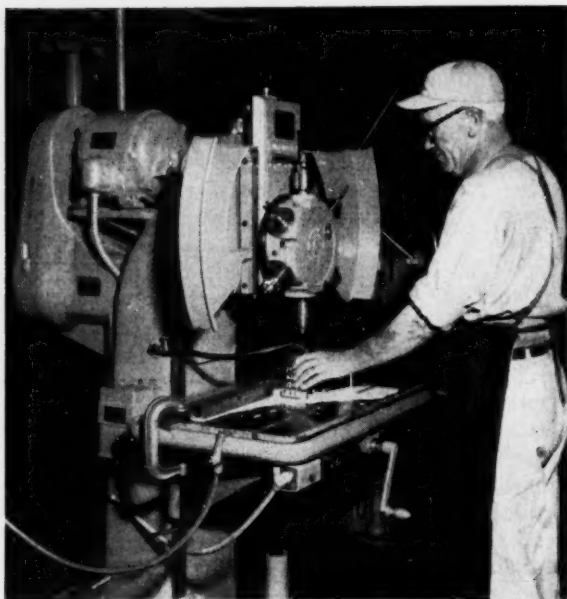
Another advantage is the specialized experience soon gained by machine shop processing personnel in processing machine shop work only. This is especially advantageous in specialized heat treating work where specific degrees of hardness or temper are required. When the machine shop must utilize plant-wide heat treating facilities, it is difficult to obtain the degree of cooperation necessary on special jobs.

In laying out the new machine shop, special attention was given to straight-line production to increase production speed, and to the effects of orderliness and neatness on precision work. The shop occupies a single straight-line bay extending across the plant building, with raw material storage at one end and the final inspection

booth at the other. The different types of shop machines are installed along this line according to the frequency and general order of their use. This eliminates much shuffling of work around the shop. The engine and turret lathes come first, followed by the mills, drill presses, grinders, and so on, arranged in the normal order of machine processes as the work travels toward completion. This does not mean, however, that machines are rigidly grouped by types. When a part must be deburred after a specific machine operation, deburring equipment will be at hand, not in some group at the other end of the shop. The same applies to in-process grinding, drilling, and other minor operations which are bound to occur during the normal course of machine shop production.



▲
In an eight-hour shift, one inexperienced operator using this Reed thread roller produced 3,600 threads. The threaded parts passed inspection 100 per cent.



Turret-type drills, with automatic speed controls, have stepped up production in the drill press department.

without rearrangement within the group.

Specialized tool cribs are used throughout the shop, with each crib adjacent to the type of machines it serves. Maintenance of perishable tools is grouped accordingly so that drill grinders, mill grinders, cutter grinders, and so on, become completely familiar with one type of work only. This follows out the old

proverb that it takes twice as long to learn to do two jobs well as it does to learn one job well.

Another idea was the installation and use of what is called a "proven and complete tool section." When a new tool arrives from the tooling department, it is delivered first to this section. From here, under the wing of a tooling expert with machine shop connections, it is taken directly out into the shop and used for a test production run. The parts produced are then thoroughly inspected and adjudged as to quality and precision. Any adjustments or minor revisions that must be made on the new tool are then made immediately, directly in the machine shop, and without returning the tool to the tooling division. This has proved to be a substantial time-saver in getting new tools into production.

Shop layout was made with an eye to roominess, orderliness and neatness, and with full realization of how important these factors are in maintaining the proper employee attitude. All machines are situated vertical to, rather than at an angle to, the main aisles. Extensive layout study prior to machine installation proved definitely that no room could be saved by angling each machine. There is at least 40 inches of clearance back of each machine, and 36 inches in front, to make power mopping and cleaning of the floor possible. All bus ducts, air lines, and so on, are installed at a common level above the machines to improve shop appearance by removing the usual hodge-podge of overhead power connections that so often prevail. In each grouping of machines, sufficient room was left for additions

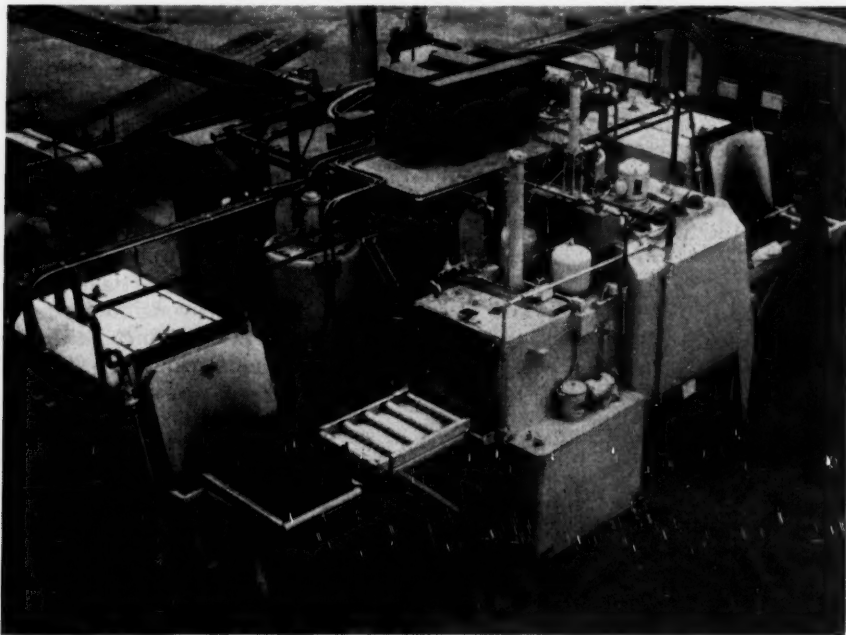
In selecting equipment for the new shop, many and diverse factors were considered. No attempt was made to duplicate the equipment contained in the home shop at the El Segundo plant. Each and every tool had to fit into a preconceived plan of high production with maximum precision. If the tool needed was not available, it was designed to, or modified in accordance with Douglas-furnished specifications.

This tooling program considered future as well as current needs. An effort was made to procure a complete range of sizes in each tool group, with some machines larger than current demands made necessary. The practical theory that big

machines can do small work, but small machines can't do big work, was applied. Many machines were intentionally over-powered, either to do heavier work than currently necessary, or to provide enough power for a change-over from high-speed to carbide tools.

All automatic machines were selected with an eye to using "double fixturing" to increase production speed. Many of these machines, with double fixtures, are already in production. With this setup, one fixture can be loaded while the part in the other fixture is being machined. In some cases, the automatics had to be provided with additional safety features for using this double fixture

This Ipsen heat treat furnace is an integral part of the machine shop. Only machine shop work is heat treated. This aids in carrying out the idea of making the machine shop entirely self-sufficient—a factory within a factory, so to speak.



technique of production machinery.

To minimize setup time, among the machines selected for installation in the new shop were five regular profiling lathes. No setup is required to profile with this equipment; yet, by merely flipping a control, the profiling lathes can be used for conventional lathe work.

Some drill presses are equipped with variable drives and with illuminated speed indicators which enable the drill press operators to adjust easily the variable speed control mechanisms until the right drill speeds are indicated. To further increase drilling speed and convenience on certain parts, several turret-type drill presses were installed.

While the largest production part ever broached or honed in the Douglas shops required only 36-inch equipment, a 60-inch broach and hone were installed in the new shop. This equipment is completely adaptable to the smaller jobs, yet the smaller 36-inch equipment could not have handled some of the prototype work that has already occurred since the shop began operations.

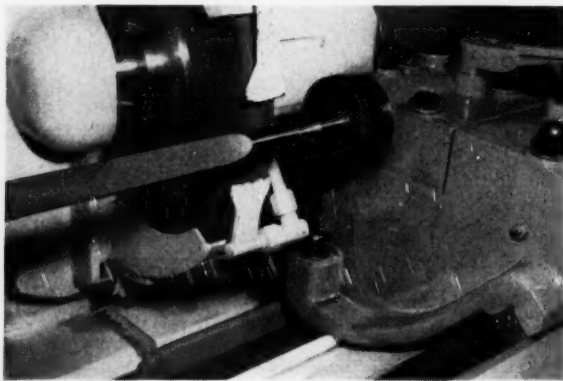
One of the first thread rolling ma-

chines ever used within an airframe plant was installed in the new shop. During one eight-hour run, an employee without previous experience in thread rolling, produced 3,600 rolled threads. These threads passed inspection 100 per cent.

Multiple rib thread grinders were installed for the majority of thread cutting operations to speed production without affecting tolerances. Hi-cycle Hydrotels and hi-cycle mills were also installed. This equipment, too, has proved its value by increased production without any sacrifice to either quality or precision.

Going out on a limb, so to speak, Douglas installed one of the new metal distintegrators, or electron drills, (Elox unit) with the thought that this machine might be useful in certain types of experimental work. Tests with this equipment in producing small, deep holes soon proved that it was useful for more than experimental work. Today the distintegrator is being used as a production machine to produce small, deep, but very accurate holes in some parts.

Control in the new Douglas shop centers around the leadman. The leadman is responsible for costs and production within his group. He is also responsible for the quality of work turn-

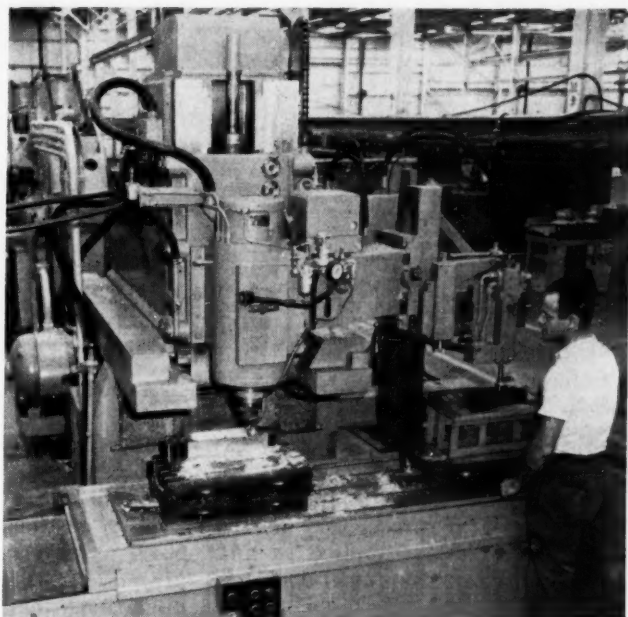


Multi-rib thread grinders have been installed for the majority of thread cutting operations to speed production without affecting tolerances.

Cincinnati high-cycle Hydrotel in operation. This is believed to be the first high-cycle Hydrotel installation in an airplane production plant.

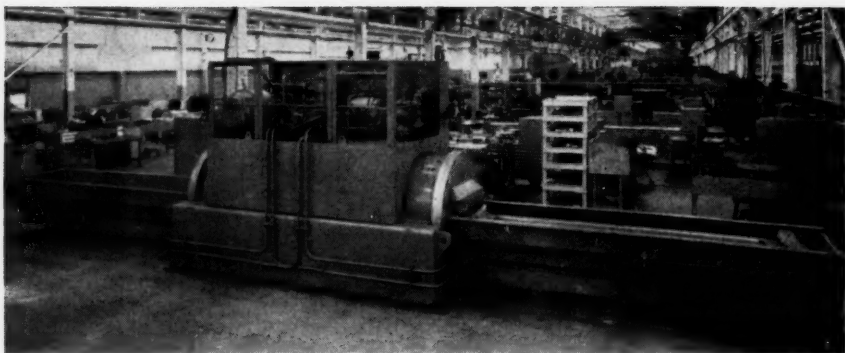
ed out by the employees under him. Leadman check stations have been set up throughout the shop, each provided with a complete range of checking and inspection equipment, so that each leadman can determine for himself the quality of work being produced by any one employee under his control, or by the group in general. Bench centers, surface plates, comparators, and so on, are installed in each of these leadman check stations to facilitate this phase of the work. From the management side of the picture, each leadman is provided with a weekly cost analysis of his particular facet of production, thus enabling him to take whatever steps are necessary to correct adverse situations immediately.

Production control within the machine shop has also been broken down, or decentralized, so that individuals doing production control work confine their activities to certain sections of the shop. This, too, follows out the theory that familiarity breeds efficiency, and familiarity



with a small portion of the shop and its activities is much easier to attain than familiarity with the shop as a whole.

At first glance, it might seem that Douglas engineers had a "golden opportunity" in laying out, tooling, and operating the new B-6 machine shop. Ample space was available; a backlog of years of experience in the home plant shops could be utilized to avoid past errors and emphasize good points. This was true to some extent. At the same time, the overall "philosophy" behind the new shop has no parallel. Layout, tooling, and operation of the shop are exploring entirely new concepts of mass produced precision. Many of these new ideas, while perhaps not directly applicable to an old and established shop, could be gradually



One of three Verson-Wheelon hydropresses now in use at the new plant.

worked in as changes become necessary.

The double fixturing innovation to increase the production of the automatics can be applied in any shop with proper tooling and a mini-

mum of machine modification. The idea of making the machine shop self-sufficient, a factory - within - a - factory, so to speak, can be emphasized as new tools and equipment are added. Many minor processing operations that in most shops require tedious routing of work to other portions of the plant can be installed and operated at a cost that will soon be amortized by the increased convenience.

This article was not written with the thought that anyone will try to duplicate the new Douglas machine shop. Only a "start from scratch" would permit this. But some of the many new "design features" incorporated in the layout, tooling and operation of the new shop may strike a spark somewhere and thereby be of help. Therefore, we at Douglas are passing along this information.



Table load of parts on one of the new Verson-Wheelon presses.

Case History No. 12

Machining Stainless Steel

By G. J. STEVENS*

Part: Valve needle for steam trap. Made of Type 303 stainless steel bar stock.

Operation: Rough and finish turning and cut-off.

Equipment: Automatic screw machine.

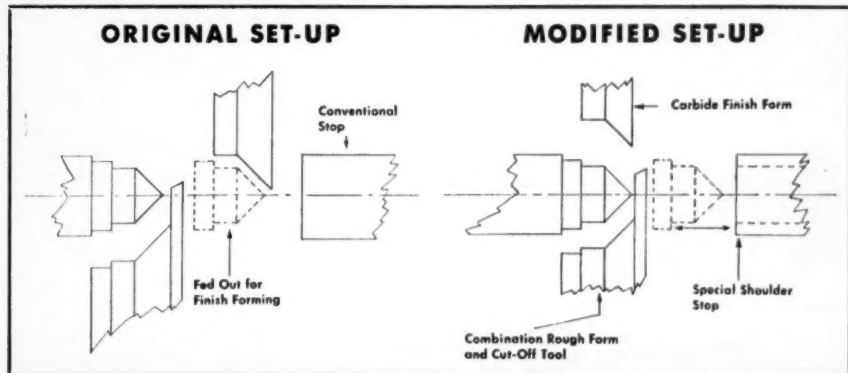
Problem: Poor finish on conical valve point which must be accurate and smooth to maintain a leakproof seat in trap.

Original Set-Up: Roughing cut was made close to collet with combination cut-off and form tool. Because use of conventional stop damaged the rough turned point, it was necessary to (1) move bar stock up to cutting-off position before starting finishing cut and (2) leave 15 thousandths for finishing cut. This

was done to compensate for collet runout and to leave enough material to turn a good point on the conical portion. The relatively heavy finishing cut combined with the chatter from collet overhang made it difficult to produce a good finish, even with carbide tooling.

Modified Set-Up: The stop was bored out to permit locating bar for cut-off operation against turned shoulder instead of against conical point. This simple change made the following things possible: (1) permitted rough and finish turning in the same collet position; (2) prevented damage to conical point, shortened overhang, and eliminated collet runout, thus making it possible to reduce the finishing cut to 5 thousandths; and (3) finish was improved greatly.

* Machining Engineer, Armco Steel Corp.



Machined Parts and Their Dimensional Control in Heat Treatment, Part II

By HOWARD BOYER

The author concludes his discussion of the dimensional changes produced in machined parts during heat treatment.

SINCE practically all heat treated steels are tempered at some temperature varying from about 300 deg. F. to 1050 deg. F. or even higher, it is logical to ask the question: What effect does the tempering operation have upon volume changes? After all, it is the condition of the parts after heat treatment is completed in which practical individuals are mainly interested. In general, it can be stated that tempering causes a

transformation of the hardened structure which tends to decrease the volume. This action is usually noticed slightly even though the tempering temperature may have been only 300 deg. F. The volume decrease becomes more noticeable as tempering temperatures are increased, gradually decreasing in volume to the original dimensions of the annealed steels as the annealing temperatures are approached. This is

true only when the single martensite is involved. Tempering does tend to decrease the volume of the fully hardened structure, but when retained austenite is present, almost immediately a transformation to mar-



“Tempering does tend to decrease the volume of the fully hardened structure.”

tensite is started.

Thus, there are two actions taking place, the martensite is shrinking while the portion which was austenitic is expanding by transformation to martensite. Such a condition makes a net result most difficult to predict. For most practical purposes, however, the net change is not very great in either direction.

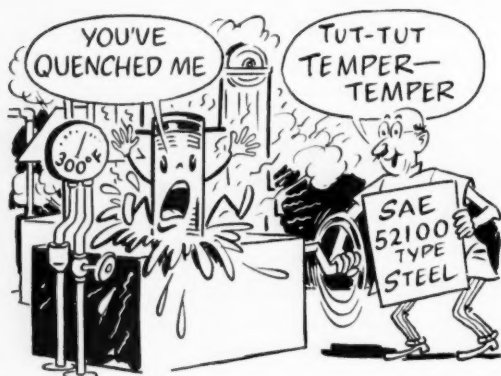
Many studies have been made using a wide variety of steels in an attempt to provide some practical working data relative to volumetric changes in heat treated steels. Even though many variables have been encountered, average results do correlate to some degree with theoretical calculations and quite closely with studies which have been made by metallography.

Such studies have provided some practical working data. Table I shows average results for three different steels which were studied extensively. The steel denoted in the Table as Type A is the well known SAE-52100, commonly referred to as Ball Bearing Steel. This particular steel showed a carbon content of 1.02 per cent and a chromium con-

TABLE I
EFFECT OF HEAT TREATING UPON
DIMENSIONS OF THREE DIFFERENT STEELS

	LENGTH	DIAMETER
STEEL "A"-ANNEALED	5.4267"	1.0262"
STEEL "A"-HARDENED	5.4380"	1.0277"
STEEL "A"-TEMPERED-300°	5.4366"	1.0274"
STEEL "A"-TEMPERED-500°	5.4351"	1.0266"
STEEL "B"-ANNEALED	6.0242"	1.0387"
STEEL "B"-HARDENED	6.0287"	1.0394"
STEEL "B"-TEMPERED-300°	6.0289"	1.0401"
STEEL "B"-TEMPERED-500°	6.0310"	1.0409"
STEEL "C"-ANNEALED	5.8588"	1.1982"
STEEL "C"-HARDENED	5.8507"	1.1967"
STEEL "C"-TEMPERED-350°	5.8521"	1.1967"
STEEL "C"-TEMPERED-900°	5.8577"	1.1979"

tent of 1.44 per cent and about .30 per cent manganese. Nickel and molybdenum existed only as residuals. *Test bars slightly under 6 inches in length and about 1 inch in diameter finished all over were heated to 1550 deg. F. and quenched in oil. The subsequent tempering was conducted at 300 deg. F. respectively. The length and diameter, accurately measured, is shown for the annealed state, fully hardened condition, as well as conditions after tempering at 300 and 500 deg. F. All measurements were conducted in a constant temperature room, the test specimens being allowed several hours in each instance to assume the*



"Test bars slightly under 6 inches in length and about 1 inch in diameter, finished all over were heated to 1550 deg. F. and quenched in oil."

amount of expansion is recorded after Type B steel was tempered at the 500 deg. F. This fact indicates that a great deal of austenite had been retained upon quenching which continued to transform as the tempering

temperature of the room before measurements were made. It will be noted that this steel behaved very much as might be expected for a relatively deep hardening or higher hardenability steel. In other words, fully hardening the pieces produced an increase in volume compared to the same test specimens in the annealed state. A 300 deg. F. tempering caused a slight decrease in volume and a further decrease was noted at 500 deg. F. Little or no retained austenite would be expected in this type of steel, so that it would rarely be an influencing factor.

The steel denoted in Table I as Type B was AISI-9315 which contained .16 per cent carbon, 3.25 per cent nickel, 1.10 per cent chromium, .10 per cent molybdenum, and .53 per cent manganese. Test specimens similar in physical size were used to study behavior of this steel. The test specimens were carburized to a depth of about .030 inch and quenched in oil. It will be noted that the steel expanded to some degree upon hardening and continued to expand slightly after having been tempered at 300 deg. F. An even greater

ing temperature was increased to 500 deg. F. *Hardness tests and metallographic examinations readily substantiated this theory.* Tempering at still higher temperatures tended to cause some shrinkage, due to the fact that most of the retained austenite had transformed and the martensite was constantly shrinking as the tempering temperature was increased. Straight carbon or lower alloy types of carburizing steel which tend to retain a lesser percentage of austenite generally achieved their maximum volume after quenching, then varying from a slight amount of shrinkage to no change whatsoever after tempering at 300 deg. Fahrenheit.

The lower portion of Table I shows the results of somewhat similar tests employing Type 440C stainless, which is denoted as Type C on the tabulation. This steel is normally regarded as an extremely high hardenability steel containing about 1 per cent carbon and 17 per cent of chromium with a few minor constituents. Similar test specimens were air cooled from 1950 deg. F. after having been measured accurately in

"Hardness tests and metallographic examinations readily substantiated this theory."

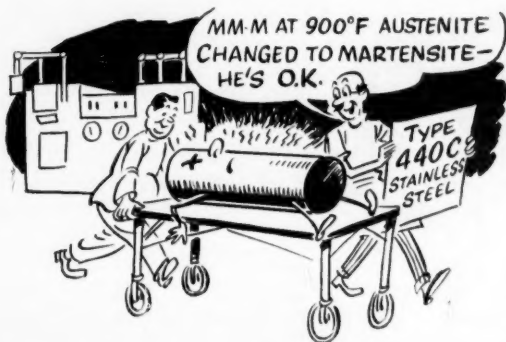
the annealed condition and then tempered at 350 and 900 deg. F. respectively, measurements being made at the various steps.

It will be noted that Type C steel decreased in volume appreciably after being hardened, which immediately indicates that an appreciable percentage of the volume at this point is retained austenite, the lowest volume constituent. This condition is further indicated by the fact that the test specimens tended to increase slightly in volume even with a 350 deg. F. tempering temperature, although it is well known that this relatively low temperature will convert but very little of the retained austenite. *It is likewise well known that a major portion of such retained austenite will be transformed to martensite after tempering as high as 900 deg. F. so that results of tempering at this elevated temperature are also given.*



It will be noted that the final result is an appreciable expansion, although the actual volume is still very slightly less than the volume of the original test pieces in the annealed condition. Again it must be emphasized that the results given in Table I are average figures for many tests made with these steels and some variations were encountered, although the results given herewith are regarded as average and typical for the steels under discussion. There are evidently several variables which do influence volumetric changes, some of which we do not fully understand. For example, one

heat of steel Type A was found to expand in length as much as 0.003 inch per inch in the fully hardened condition compared to the volume in the annealed condition. In other in-



"It is likewise well known that a major portion of such retained austenite will be transformed to martensite after tempering as high as 900 deg. F."

stances, this steel of essentially the same composition and heat treated in exactly the same manner showed less than 0.001 inch per inch. It has been found that an average expansion for a steel of the type denoted as "A" will be about 0.0015 inch per inch between the annealed condition and its condition after having been hardened and tempered at 300 deg. F. This figure has been found to be fairly practical as a working dimension for process engineers, although there are some exceptions which are most difficult to account for.

It is obvious from the summary of data given in Table I that for most practical applications the amount of volumetric change in heat treating is probably not sufficient to be of any great concern. Volumetric changes which are widely and consistently out of limits shown above should immediately cause suspicion of poor control in heat treating. Excessive temperatures during high heat operations promote grain growth in any type of steel. *Coarse grained steels, particularly those high in alloy content, tend to retain*

more austenite upon being cooled to room temperature, so that the volumetric changes, generally speaking, will tend to be erratic and may bear little relation to figures such as shown in Table I. In other words, this phase remains in the hands of the heat treater, and control of the heat treating temperatures and time cycles are of the utmost importance, if any degree of consistency is to be maintained relative to dimensional changes. In other words, the figures given in Table I represent an average of the changes over which the heat treater has little or no control, so that suitable allowances are necessary by the designers and process engineers.

It is usually assumed that warping or distortion, which is frequently apart from volume change, is entirely the responsibility of the heat treater. This is far from the truth. Potential deformation in machined parts is nucleated at the time of design and steel selection and further accentuated in the fabrication of the parts prior to heat treatment. In many instances the heat treating operation merely brings out the "built in" errors. It is not meant to infer that the heat treater has no responsibility relative to deformation, for a great deal of the deformation can be minimized by proper heat treating tech-



"Coarse grained steels, particularly those high in alloy content, tend to retain more austenite upon being cooled to room temperature, so that the volumetric changes, generally speaking, will tend to be erratic."

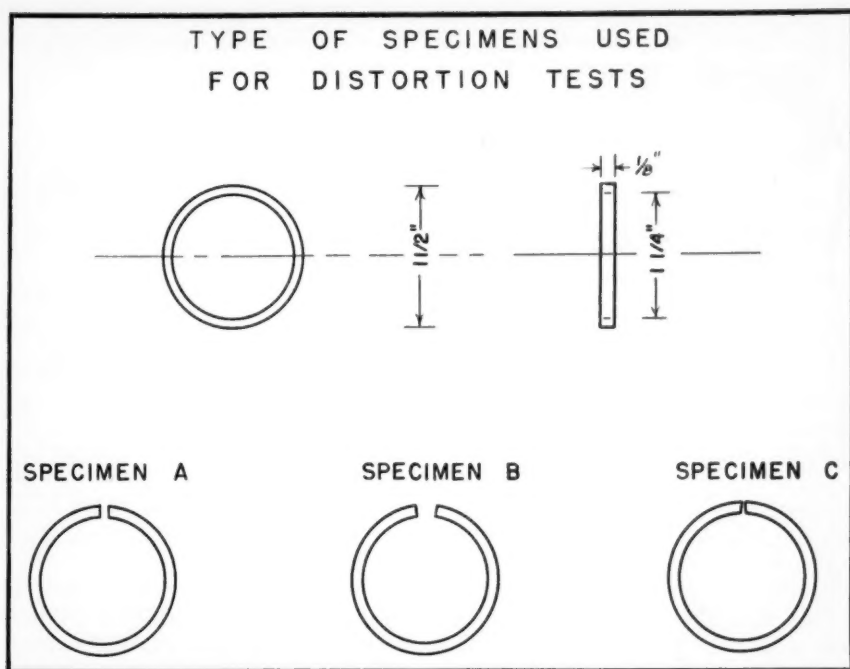


Fig. 6—Effects of machining stresses can be proved by simple test pieces as shown herewith.

niques. Careless handling such as placing parts in the high heat furnace so that they will actually tend to warp from their own weight, as well as careless handling during the quenching operation, has been responsible for a great deal of deformation. These sources of trouble are well known and have been so much discussed that they hardly warrant any space in this treatise, so that, at this time, it will be assumed that the parts will be treated in proper equipment and handled with a reasonable degree of care.

Before any form of cure for deformation can be successfully achieved, it is essential to know the causes.

Aside from those just mentioned, which are actually in the category of carelessness, deformation is caused mainly from unbalanced residual stresses, indeed a very broad term. In many instances, parts are delivered to the heat treating shop in a highly stressed condition resulting from machining or other cold working operations. As soon as such parts are placed in the furnace and start their heating cycle, the warping begins and continues up to about 1150 deg. F. which is usually a sufficiently high temperature to remove residual stresses affected by cold working and machining. As the steel becomes hot it loses its strength and

(MEASURES THE SAME-HE'S IN A STATE OF STRESS BALANCE!)



"The gap remained at the same width after cutting which proved that the ring was in a state of stress balance."

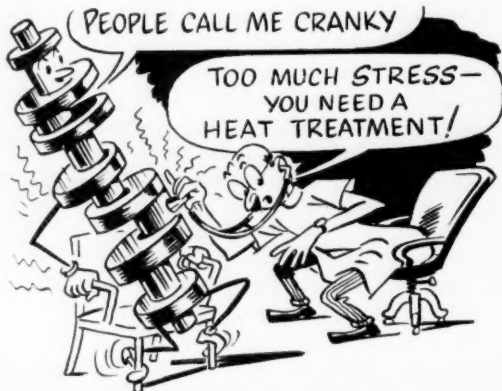
to form the gap as shown. The gap remained at the same width after cutting which proved that the ring was in a state of stress balance. Specimen B was machined with 0.010 inch of stock on the outside diam-

tends to relax itself so that the deformation is already present in the heating cycle.

The influence of machining stresses may be illustrated in a very simple manner. Figure 6 shows test specimens of the type which have often been employed by the author to study residual stresses. At the upper part of Figure 6 are shown the dimensions of these test specimens which are simple rings made from a 1 percent carbon low alloy steel. Specimens A, B, and C were employed to demonstrate the effect of small amounts of o. d. and i. d. grinding. Specimen A, prior to cutting the slot shown at the upper portion, was machined to size and stress relieved by heating to 1150 deg. F. The ring was then cut apart using a rubber wheel in an underwater cut-off machine

eter before stress relieving. After stress relieving this specimen was ground on the o. d. so that the dimensions were identical to that of Specimen A. Cutting with the rubber wheel was then performed in the same manner.

Results are obvious; it will be noted that the gap immediately increased to approximately twice its width, proving that the o. d. grinding imparted severe tension stresses to the outside. Specimen C was processed in the same manner as Specimen B, except the stock was left on the i. d. and remove by grinding after the



"This situation can be remedied to a great extent by inserting a stress relieving treatment at a suitable point in the sequence of operations."

stress relieving operation. In this instance the tension stresses were on the inside and tended to pull the ring almost together.

Almost any machining operations tend to impart unbalanced residual stresses to parts; naturally more operations and the greater speeds at which they are performed provoke the condition. *This situation can be remedied to a great extent by inserting a stress relieving treatment at a suitable point in the sequence of operations.* This merely consists of heating the parts for a short length of time at about 1150 deg. F. after most of the machining has been performed. The major part of the warpage will then take place and a few semi-finish or finish operations may be used to true up dimensions, after which there is a much better chance that the parts will remain close to those dimensions through treatment. It must be understood that stress relieving treatments are not a cure-all, but in most cases they are of considerable assistance if applied carefully in the sequence.

Another example of unbalanced residual stresses is illustrated in Figure 7. It is common practice for those in charge of setting forth material and heat treating specifications to prescribe certain portions of parts made from carburizing steels to be stopped off so that they will remain free from carburization. It is granted that this practice is often required in order to meet certain mechanical properties, but stopped-off portions should be specified with great care and never except when absolutely necessary, if the unbalance of stresses created by this practice is at all important. It was stated in an

earlier paragraph that carburized surfaces tended to grow in heat treatment for the reason that material was added, the result being that the steel part becomes a duplex material after carburizing.

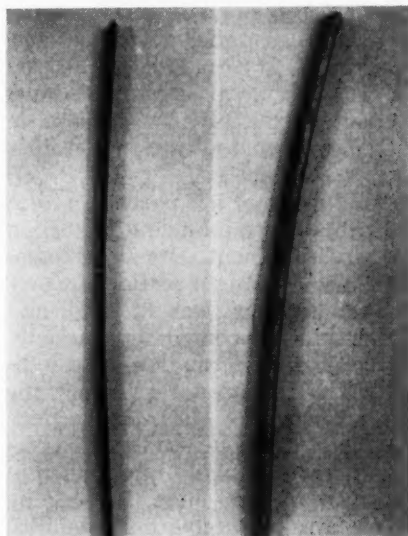


Fig. 7—Specimens used to illustrate how unbalanced stresses created by the use of stop-off material may contribute to excessive deformation in heat treatment.

Figure 7 shows two strips of steel about ten inches in length, one inch in width and one eighth inch in thickness. The specimen on the right was copper plated on one side only and carburized to a depth of about 0.020 inch. The specimen on the left was carburized in the same manner except it was not copper plated, thus carburizing all over whereas the copper plate protected one side of the specimen at the right. Both specimens were hardened by brine quenching from 1500 deg. F. It is

obvious that the evenly carburized specimen on the left did bend some, which might be expected with such a thin strip and a drastic quench, but the specimen which had one side copper plated bent far more and away from the carburized side, thus proving how uneven carburizing will cause an unbalance of stresses, which will, in turn, cause distortion in heat treatment. If stop-off must be employed it should be kept in mind to keep the stopped-off portions in balance.

The designer of parts can also contribute to minimizing distortion in heat treatment. Drastic changes from heavy to light sections, poorly braced portions, lack of radii, and so on, can all contribute markedly to excessive deformation. The individual in charge of selecting the types of steel for given applications also has a sizable equity in results which will eventually be obtained in the heat treating shop. Prescribing steels with a suitable hardenability value is a most important factor in the results which will be obtained later in processing.

As explained earlier in this treatise, the higher hardenability steels which tend to harden completely through the thinner sections expand more, so that in instances where both light and heavy sections are involved there is likely to be considerable stress set up between sections, due not only to the fact that the thinner sections become completely martensitic, but also because the thinner sections go through their volume change first, thus creating an unbalance of stress and subsequent warping.

So far, possible contributions from

the designer, materials engineer and process engineer have been discussed, but how about the heat treater? How much can he accomplish toward preventing distortion in the heating and cooling operations? It is true that a great deal can be accomplished by the heat treater, but it seems in order to discuss the influencing factors which must be guarded prior to the heat treating operation before venturing any discussion of how much may be accomplished in the heat treating shop.

Assuming that careless handling in the operation has been eliminated, since this treatise was not designed as a discussion of heat treating techniques, the distortion that takes place in the heating, quenching and tempering cycles is again, primarily, a condition of unbalanced stresses. If the parts were entirely free from unbalanced residual stresses as they arrived for the heat treating operation, were made from properly selected steels, and all sections were the same, there would be virtually no deformation in the heat treating operation, just minor dimensional changes which have been previously discussed. This condition would be purely hypothetical and would be impractical, if not impossible to achieve. In the first place, it is essentially an impossibility to have parts which are completely free from unbalanced stresses, although a great deal can be accomplished along this line in preliminary operations as discussed. In the second place, very few parts are so nearly symmetrical that there would not be uneven heating and cooling rates in the various sections. When steels are quenched from the high temperature phase the

"The work is then held, as in a salt bath, at this temperature for a time period varying from a few seconds to a few minutes . . ."

actual hardening does not take place until temperatures in the range of about 500 deg. F. are reached. At this temperature, or at least in that range (depending upon the type of steel and high heat temperature), the hardened structure forms rapidly as further cooling takes place. Therefore, in parts which are normally quenched in water or oil, thin sections have been fully hardened long before heavy sections, so that there is general shift and tendency to some warping due to the volumetric changes taking place unevenly. It is true that some deformation may also take place in the heating cycle, due to the uneven volume changes, but at this point the steel is in a relatively soft condition, so that this factor is far less influential.

During the past ten or twelve years, a great deal has been accomplished along the line of minimizing deformation by employing the use of a step quenching technique commonly known as martempering or marquenching. This technique merely involves quenching the material rapidly to a temperature just above that where the hardened structure begins to form. *The work is then held, as in a salt bath, at this temperature for a time period varying from a few seconds to a few minutes, depending upon the section sizes,*

THIS SALT BATH
WILL EQUALIZE TEMPERATURE
IN VARIOUS PARTS



until the temperatures in the various sections have had an opportunity to equalize. The work is then removed from this holding bath and allowed to harden normally as cooling to room temperature takes place. By using this technique it is easy to understand that the hardened structure forms in the various sections at a far more nearly uniform rate, consequently being a valuable contribution toward minimizing deformation from this cause.

Figure 8 illustrates what can be accomplished with the use of this marquenching technique. The test pieces were made from high carbon, low alloy steel bars machined in the form of tubes, the shape of the test piece being shown at the right-hand corner of Figure 8. These tubes were approximately 5 inches in length and 1 inch in outside diameter. The bore was approximately $\frac{3}{4}$ inch in diameter, thus leaving a wall thickness of $\frac{1}{8}$ inch. These test specimens were rough machined, stress relieved and then finish machined to extreme-

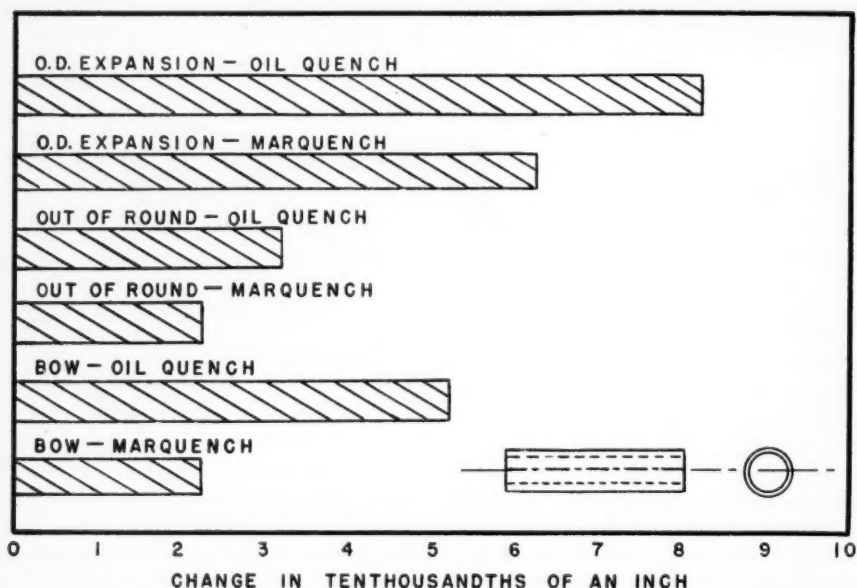


Fig. 8—Comparison of results obtained by marquenching and conventional oil quenching.

ly accurate dimensions. They were all heated in the same manner, except that some of them were quenched in oil while the others were quenched in a salt bath held at 500 deg. F. The test specimens were allowed to remain in this bath for a period of one minute and then air cooled to room temperature.

The bar-graph on Figure 8 is self-explanatory. It will be readily noted that the marquenched specimens showed improvement relative to amount of bow, out-of-roundness and even a decrease in o. d. expansion; the latter must have been due to the difference in stresses during the actual hardening, because theoretically the expansion should be about the same using the two different methods of quenching. At least, Figure 8 proves that the marquenching

technique is a step in the right direction in instances where it lends itself to practical use.

Holding work in alloy fixtures during the heating and quenching operations has been explored extensively and oftentimes is a practical means of minimizing distortion, but it must be remembered that these holding fixtures are generally made of high alloy materials so that they are expensive to purchase besides the fact that heating these fixtures is also expensive; therefore, the cost usually precludes the use of such methods. Often warping of the actual fixtures defeats the end results.

Quenching machines which hold parts in position during the quenching operation are often employed to a distinct advantage, but such equipment involves large expenditures of

"This treatise would hardly be complete without some mention of parts which are nitrided."

money and, due to the fact that separate sets of tools and dies are usually required for each individual part, the cost is generally prohibitive unless extremely large quantities of the same parts are being processed.

This treatise would hardly be complete without some mention of parts which are nitrided. Many engineers wrongly assume that parts can be case hardened by nitriding without any deformation or growth. It is true that the amount of growth for volumetric expansion is very small, although there again material is being added so that surfaces which are nitrided do tend to expand in somewhat the same manner as carburized cases, although generally not quite as much. Likewise, since temperatures involved in nitriding are relatively low (usually just under 1000 deg. F.) the effect of unbalanced residual stresses is also less. It must be remembered that even at this temperature a large portion of the stresses are relieved, so that some deformation will take place in parts of an intricate nature and which have been subjected to many machining operations. Therefore, if the ultimate is to be achieved in a minimizing deformation the processing layout for such parts must be given careful consideration by process engineers. Stress relieving at a late stage of machining is usually the most helpful.



In conclusion, it is evident from the foregoing that there is no quick and easy way to minimize deformation and volume changes. There is no question of the fact that there must be some allowance for volume changes and deformation, which can be minimized only by the close cooperation of many individuals. The heat treater is by no means fully responsible, so that best results can be accomplished only by the close cooperation of the design engineers, material engineers, process engineers and the heat treating shop. There is always a question of economy, so that the design of the parts and the number of the same parts which are manufactured will dictate how much expenditure for heat treating equipment is practical in order to reach the ultimate in end results. The foregoing statement refers mainly to the use of such equipment as tailor-made quenching machinery, and so on. In shops where a wide variety of parts is manufactured in relatively small quantities, it is usually essential to make more allowance for finishing operations after heat treating than to attempt working to such extremely close tolerances without special equipment.

How To Select Color for Your Plant and Equipment

By ELLIOT ROGAN

*Scientific new painting system creates better
employee morale and efficient production;
promotes safety in machine shops.*

FROM a casual acceptance as a part of structural makeup or finish to its established role as an efficient industrial production tool . . . this has marked the progress of *color in industry*. While practically little or no regard was given to color at one time, alert industrialists have become keenly aware of the inherent power and energy in color as a productive factor. In the past decade modern science and research have combined to establish its practicality in industry.

Prior to World War II a steadily increasing trend to color consciousness was evident, particularly in such widely divergent fields as store fronts, automobiles, restaurants and packaging. This color emphasis on products, however, constituted the range of color usage in business and industry as there had not yet been fully developed the scientific color precepts which, when applied to industry, would increase production.

Since the early 1940's color engineers of the Pittsburgh Plate Glass Company Paint Division have achieved much success in establish-

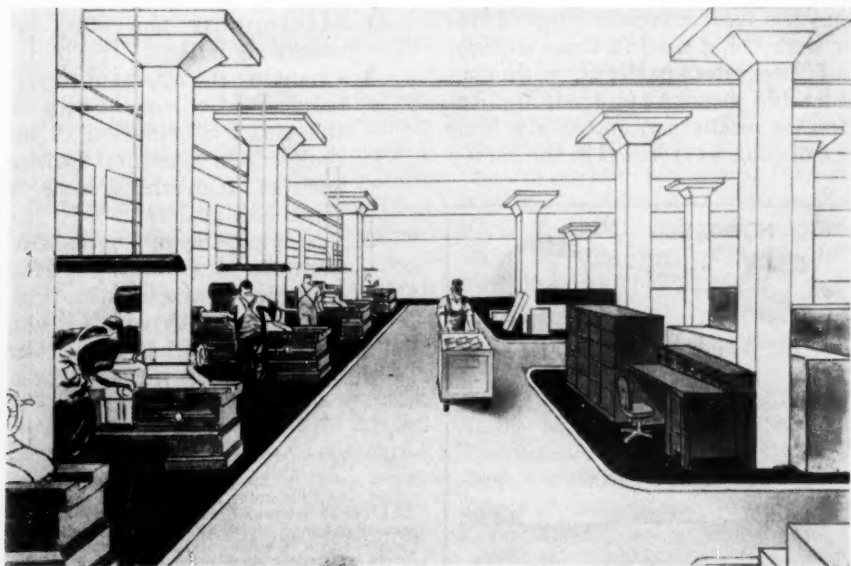
ing that paint had vitally important practical functions other than its protective and decorative qualities. Prior to Pearl Harbor they had introduced the "Styling with Color" plan which incorporated the functional applications of paint on a practical basis. While not possessing the exactness and refinements of subsequent developments in color applications, this styling represented considerable progress in utilizing color to accomplish certain physical objectives while simultaneously providing the basic paint functions of protection and decoration.

Principles of Color Dynamics Revealed

Following intensive experimentation on machinery and plants with tests incorporating discoveries in the color and the color-light fields, these engineers formulated their findings in the *Principles of Color Dynamics*. They finally harnessed the inherent power and productivity of color for practical industrial use. At the outset, color helped to increase the quantity and quality of production, reduce accidents and absenteeism,



The benefits of proper color incorporating a traffic lane are shown in these before and after drawings. As shown, the before view in the drawing above is in the usual grays while that below has a ceiling of Cascade blue (a blue-green), yellow pillars, dark and light gray floor, traffic lanes and cart in Focal orange, and machinery in Vista green.



and improve employee morale through the use of its natural psychological, symbolical and visual powers. Color does its work by "moving" critical parts of machinery into focus, "moving" ceilings upward and walls outward, and bringing assembly lines and materials into sharper contrast without actual motion.

At first, practical-minded production men were slow to see how color on the wall, on the machinery or on the material, could be an additional force to production. After color engineers had analyzed plants and their recommendations were initiated, color rightfully established itself with the drill press, the lathe, the rig, or the fixture, as a solid measurable item on the production schedule.

The Principles of Color Dynamics were employed in 46 plants ranging from small machine shops to huge airplane factories. A survey revealed that the basic characteristics of color were being used in three distinct but integrated patterns, with considerable emphasis on color application for production and safety. This use of color as revealed in the survey

is summarized as follows:

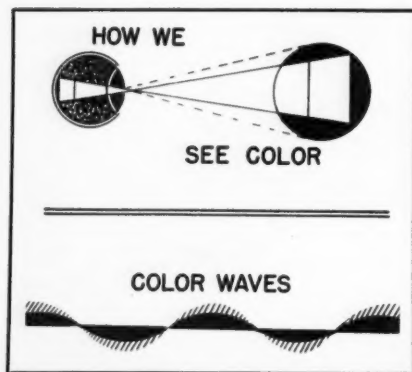
A. The symbolical characteristic of color, that inherent quality by which custom or practice has associated a product or function with a particular hue, was used for:

1. Identification of materials and equipment. Although not basically new inasmuch as some plants have employed some color symbols for a long time, the ramifications of its modern use can be classed as an industrial innovation.
2. Speeding production by adoption of color codes, particularly for materials.
3. Improving the decorative scheme.

B. The psychological characteristic of color, that inherent quality by which color can be made to create advantageous optical illustrations, was used for:

1. Minimizing the effect of weight or bulk.
2. Changing the apparent physical proportions of an area or the visual elimination of an undesirable structural feature such as an overhead mass or pipes and girders.
3. Changing the apparent temperature of a working area.

C. The physical characteristic of color, that quality by which it can be classified as either brilliant or dull, glaring or non-glaring,



Light and thus color travels a path that looks like ocean waves. These waves travel at the amazing speed of 186,000 miles a second. The wave length of each color is different as is the effect each color creates.

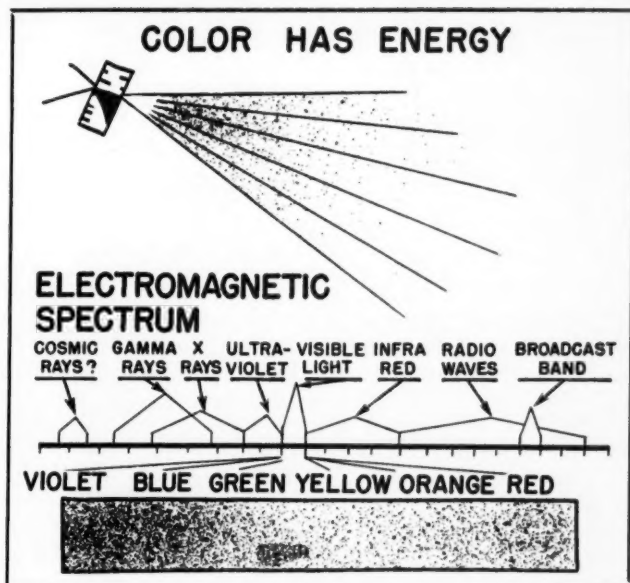
Color, in the form of light, is part of the electromagnetic spectrum and like other octaves possesses actual energy.

strong or weak, was used for:

1. Inducing orderliness in the working area, or, in other words, developing a sense of good housekeeping and safety.
2. Reducing eye-strain and body fatigue.
3. Eliminating specific safety hazards.
4. Minimizing illumination maintenance costs.

In view of the fact that production officials were employing any number of new industrial incentive programs concurrently, the survey was not an attempt to determine the exact plus or minus value of a color application percentage-wise. The survey was conducted to establish the general trends and accomplishments of scientific color use. Seventeen varied types of industrial and manufacturing activities, ranging from aircraft and automotive production to assembly by electronic devices, textile production, and food and drug preparation were included in the survey. The Color Dynamics application on machinery and surroundings in these

COLOR HAS ENERGY



plants has transformed them from a dismal, machine-gray atmosphere to colorful, morale-building production areas. The soothing color combinations prescribed by this scientific new painting system are offering relief for eye muscles and nerves of operators working to very close tolerances on lathes or fitting intricate machine assemblies. Color applications in small, one-room machine shops to large steel mills are creating improved working conditions for employees.

Color Dynamics Applied to Machines

Essentially, Color Dynamics can simply be understood by thinking of it as exactly the opposite of camouflage. Instead of obscuring and hiding as in camouflage, color is used to emphasize and reveal, making it easier for employees to see their

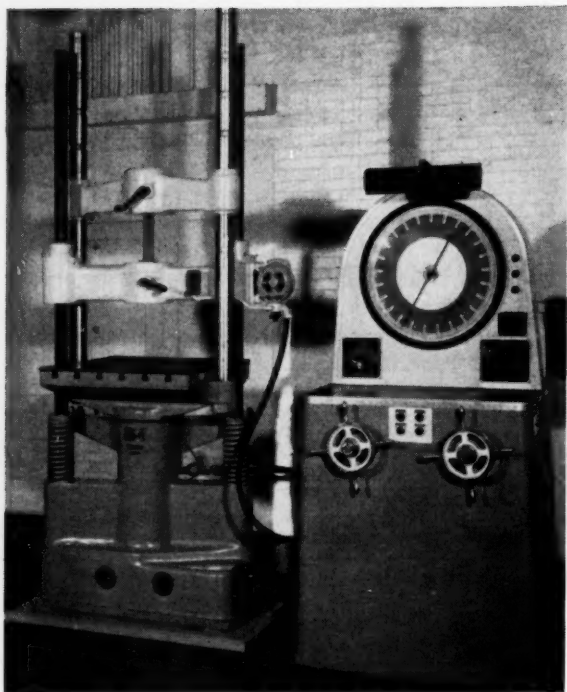


Illustration showing an excellent example of how properly applied color can make the operating parts of machines stand out. The Color Dynamics application to the machine shop at Carnegie Institute of Technology, Pittsburgh.

pletely wrong if the material is aluminum or stainless steel. The worker is constantly straining to see where the material ends and the machine begins. There is no easy-to-see line of division. The ideal situation is one where the focal color provides a satisfactory contrast with both the stationary part of the machine and the material flowing through it. When this double contrast is

work. On machines, color is utilized to high-light the operating parts so they stand out—to give a clear contrast between the machine itself and the material being fabricated — to force the worker's attention on his job. Eye wandering and nervous tension are minimized in this manner. The walls are painted in eye-rest colors which do not force the individual to make fatiguing adjustments.

The first job of Color Dynamics is to separate the critical from the non-critical parts of the machine, and where possible, visually to divorce the critical parts from the material being fabricated. For instance, a focal color of light gray is com-

achieved, eye travel is discouraged and tension is reduced.

To successfully accomplish this end, a color that comes quickly to the eye, or literally "pops up," in clear-cut contrast to the stationary or non-critical parts of the machine is essential. This is referred to as a focal color, among which are Focal Ivory, Buff, Light Green, Blue, Yellow, Beige, Red, Orange, Focal Light Gray and Focal White and Black. Primarily, the focal color, in combination with contrasting colors, focuses the worker's attention exactly where it should be—arrests his eye and reduces the unnecessary travel which is found to occur when the whole machine is a monotone in

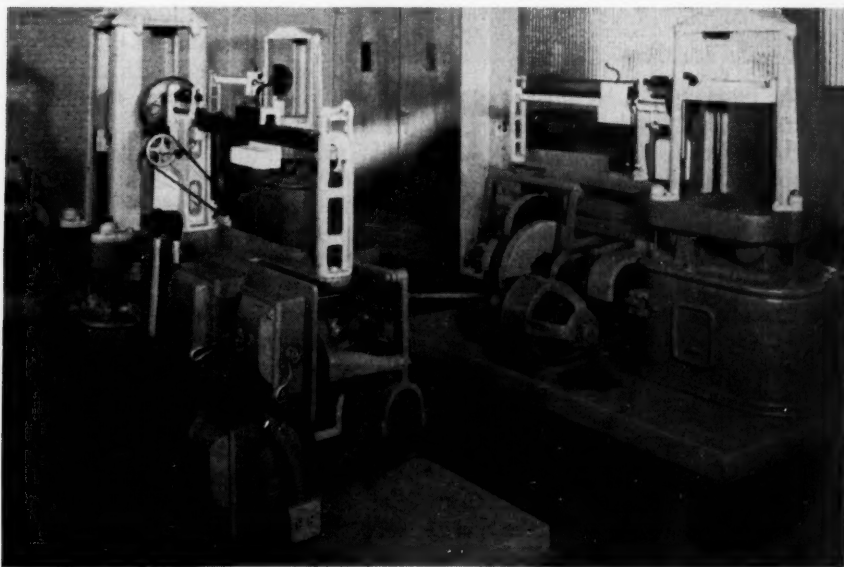
"machine gray." Unnecessary eye travel throughout the working day is a common source of eye fatigue. As the critical part of the machine must come *forward*, the non-critical parts must *drop back*. The widely-used "machine gray," which is in itself a somewhat depressing, morale-lowering color, accomplishes this to some extent.

Following careful study and research, a receding color, *Vista Green*, was developed and recommended for the body of most machines. Occasional exceptions to this rule are those in plants employed in food preparation when it may be advisable to use white for a more sanitary appearance. Generally, however, no other color has such a relaxing effect on the human eye as

green—yet it does not act as a depressant. The widespread use of green by Nature in forest and field offers perfect proof of this point.

Contrasting and eye-resting colors are very effective in reducing machinery accidents. A receding color such as green can be used on the non-moving parts. Working parts can be highlighted in various focal colors. Switches can be painted red and the controls in orange. Machine guards or moving parts that extend into aisles should be tipped or banded with orange. Also, crushing or cutting edges should be identified by an orange stripe and the interior of electrical switch box doors and emergency switches on machines should be painted in brilliant orange. Blue is suggested as a caution color. Blue

Illustration showing how the principles of Color Dynamics have been applied to the machine shop of the Carnegie Institute of Technology, Pittsburgh.





Principles of Color Dynamics applied to machinery and equipment at Jones & Laughlin Steel Mill, Pittsburgh.

tags or flags should be employed to "warn against" moving equipment on which work is being done. Blue discs can also be hung on machine controls when the machine is being repaired. This type of color pattern presents a scene of visual orderliness that develops a sense of good house-keeping and safety in the employee.

Color Treatment for Walls and Ceilings

Various colors were developed for treating the walls, ceilings and other plant surfaces to achieve the fundamental aim of Color Dynamics, i.e., cheerfulness, plus restfulness and good visibility. Color not only has a physiological effect on the worker's

eyes and body—it also has a psychological effect on his mind. All other things being equal, almost everyone feels somewhat more lighthearted on a sunny day than when the skies are overcast. Yet many factories today use colors on walls and the ceiling which give the impression of a perpetually cloudy day. Colors that suggest sunlight are strongly recommended for cheering up such an interior. In factories where the temperatures must necessarily be high, cool colors are utilized to act as mental and emotional stabilizers, whereas warm hues are advisable where low temperatures must be maintained.

Where certain light walls stand directly in front of dark machines, or vice versa, in the employee's field of vision, his eye has to make a quick adjustment. To make this adjustment a few times, very little energy is required. However, multiply it by several hundred during the course of the day and a very common source of eyestrain results. Eye-rest surfaces, therefore, should have approximately the same general *value* (reflectance) of color (though not necessarily the same hue) as the one the worker is accustomed to when he is concentrating on his

work. Pittsburgh's engineers developed a shade of green possessing the same qualities as *Vista Green* but lighter for walls.

In many plants there are certain surfaces that seem to "bear down" on the individual. An example of this is a ceiling filled with beams, wires, and pipes which give an effect of visual clutter. In these situations it is advisable to make the surface "recede" so they do not call themselves to the employee's attention. In cases where direct lighting is used, and reflected light from the ceiling is of little or no value, a cool color like *Cascade Blue* gives an appearance of spaciousness and helps make the distracting ceiling recede. For the individual it creates a feeling of more apparent space and air in which to work. Colors possessing very high reflectance are utilized for the ceiling when indirect lighting is used.

Special Colors for Floors

With the ever-increasing "traffic" in modern spacious plants today, Color Dynamics applications on floors, aisles and mobile equipment are important in their role to safeguard against accidents. Hand

COLOR CODE—PIPE LINE IDENTIFICATION

- RED . . . Fire protection materials and equipment (sprinkler systems, and so on)
- ORANGE AND YELLOW . . . Dangerous materials (acids, gases, steam 212 deg. F. - 800 deg. F., and so on)
- GREEN . . . Safe materials (drinking water, compressed air, steam below 212 deg. F., and so on)
- BLUE . . . Protective materials (gases or liquids are used as antidotes to dangerous materials)
- PURPLE . . . Extra valuable materials (usually safe, but of high value)

CAUTION

DO NOT PAINT ENTIRE PIPING SYSTEM IN ONE OVERALL COLOR

RECOMMENDED METHODS

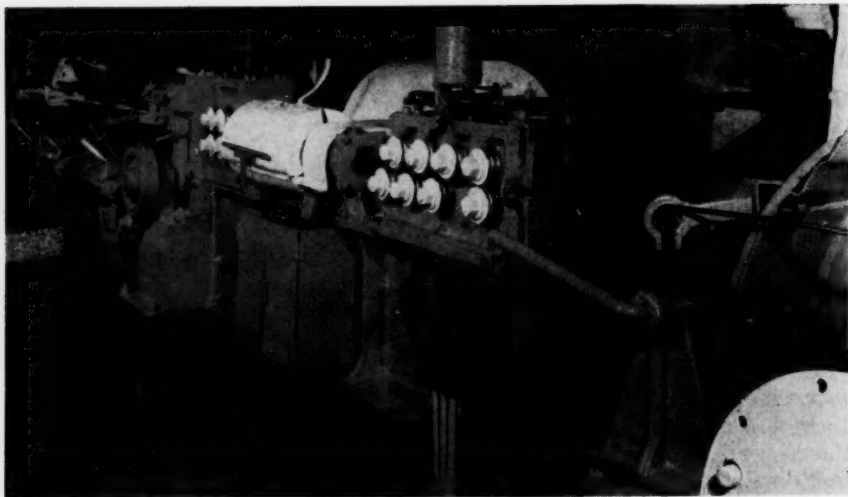
- Paint all pipes in ceiling color other than portion identified. Valves, flanges or couplings should be painted.
- Paint band pipes entering and leaving the wall or ceiling. Also band at intervals.
- Identify by colored tags or discs.
- Combine colored band with strip which identifies contents further.
- Band plus stencil identification of contents.

trucks used to distribute material and collect finished work in the small, old-fashioned factory posed far less danger than the motorized trucks for the worker who stepped too far into the aisle. Consequently, traffic lanes covering many acres of floor space in the modern plant today have become a real menace to careless employees. They present the same problems as city streets. Not only must workers be protected against their own thoughtlessness, but also truck operators should not be continually worried over the possibility of collision. Otherwise, they are likely to reduce the speed of their vehicles with a consequent lowering of efficiency.

A light Dixie Gray has been de-

signed for floors, particularly in assembly rooms. Under certain circumstances, the under portions of products being fabricated, such as an airplane wing, require more illumination which is obtained from a special white for the floors. Work benches in assembly rooms can be

laying down thick stripes of yellow, a high visibility color, to serve as boundary lines. When yellow is used in combination with black, as parallel bars, both identify non-moving objects that create hazards of striking against, stumbling over, or falling into. A special traffic white can

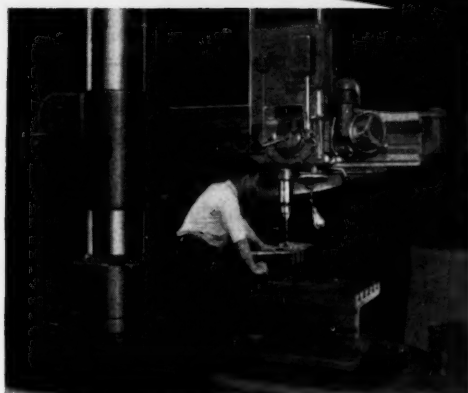


View of wire drawing equipment to which Color Dynamics principles have been applied at Jones & Laughlin Steel Mill, Pittsburgh.

treated in much the same manner as machines, with the color scheme being dependent upon the type and the color of the material worked with. Painting the plant, the machines and work benches in the same general color pattern will achieve the best results; however, any separate unit individually treated affords improvement.

To guard against collisions, mark clearly all aisles and traffic lanes. This is done by painting the entire width of the aisle in a contrasting color to the body of the floor, or by

also be employed. This will alert employees against stepping into traffic lanes and thus avoid a "traffic accident." Likewise the automotive equipment should be painted in "Danger Signal" colors possessing high visibility to warn workers of their approach. Cranes and overhead conveyors which can be maneuvered to chest height or lower at certain stations should be treated with this same type colors. Attention-getting colors should also be painted on movable bins that are used to collect or distribute material.



Photographs courtesy of the Piasecki Helicopter Corporation.

These Helicopters for Army, Navy and Air Force are being produced to exacting accuracies at the Piasecki Helicopter Corporation at Morton, Pennsylvania. A Cincinnati Bickford Super Service Radial Drill was selected for its accuracy, speed and easy handling as part of a current cost-reduction program used in the jig and fixture department producing tools for the Egg Beaters.

Write for catalog R-29.

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RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio, U.S.A.

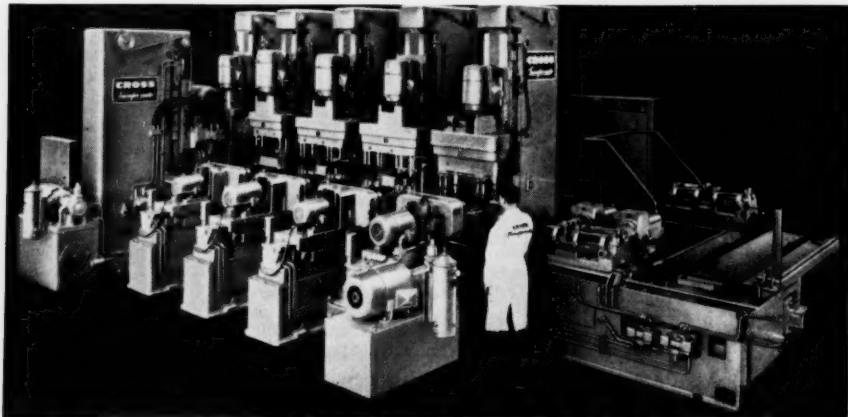
In identifying the location of fire fighting equipment, red should be used. When marking columns where fire extinguishers are located, band the columns near the ceiling and the floor as well as the extinguisher location. Paint the floor red twelve inches out from each side of the column. By marking red bands near the ceiling, fire fighting equipment is easily located from any part of the plant floor. Safety equipment and its location are identified with green. The white cross and a green background identify cabinets containing First Aid material.

The advent of color as an efficient production tool establishes a new trend on the industrial scene. Here-

tofore, with exception in the field of improved illumination, practically nothing had been expended to save workers from eye fatigue. Meanwhile, industry had spent millions of dollars on time-and-motion studies to minimize body fatigue. During and since World War II thousands of Color Dynamics applications in practically all types of shops and all types of machinery and equipment have already demonstrated that color can aid production by raising morale, reducing accidents, decreasing on-the-job and away-from-the-job absenteeism and stimulating a higher degree of good housekeeping and cleanliness with its attendant economics of operation.

Special Machine Tool for Intake Manifolds

SHOWN herewith is a special Transfer-matic type machine tool, announced by The Cross Co., Detroit 7, Mich., which drills, bores, and mills intake manifolds at the rate of 218 per hour at 100 per cent efficiency. The machine, which has seven stations, including loading and unloading, performs 54 operations—22 drilling, eight chamfering, two reaming, 12 tapping, eight boring, and two milling. Two parts are machined at one time at each station. Palletized work-holding fixtures are used to carry the irregular-shaped manifolds automatically from station to station, and power wrenches are used for operating the work-holding fixtures automatically. The machine also incorporates preset tools, built-in chip conveyor, and automatic cleaning unit for removing chips from fixtures. Electrical and hydraulic construction is to J.I.C. standards.



Users report excellent results with New Sunicut S Oils

In just six months, these unique new straight cutting oils have "Job Proved" themselves as top performers in many metalworking shops all through the industry.

From the field, reports like these keep coming in:

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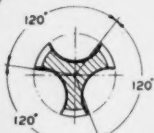
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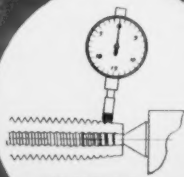
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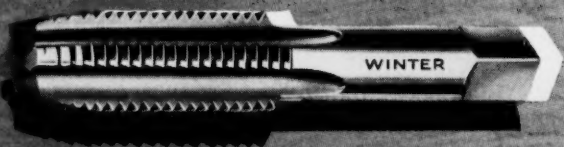


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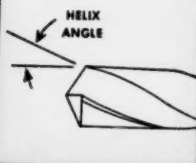
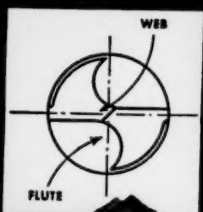
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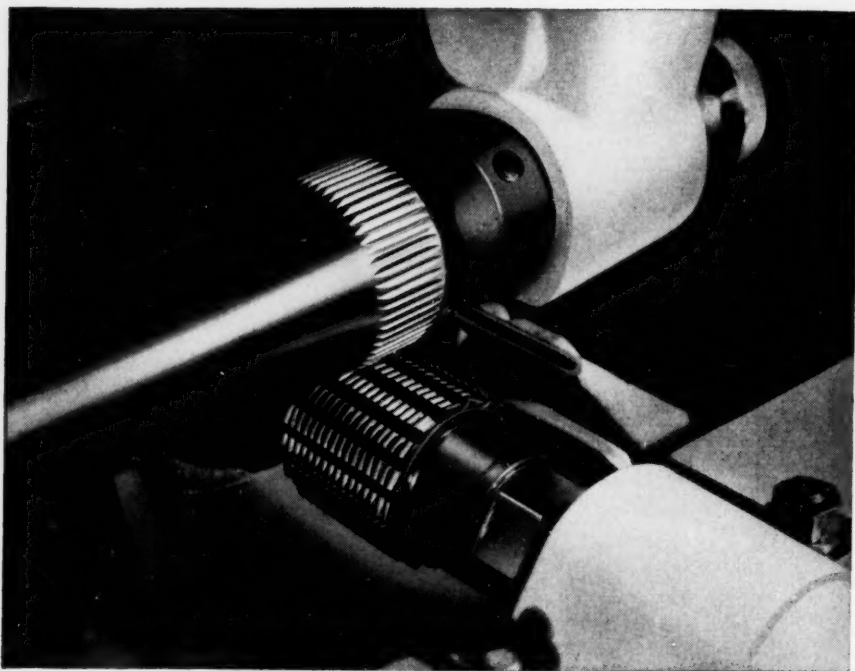


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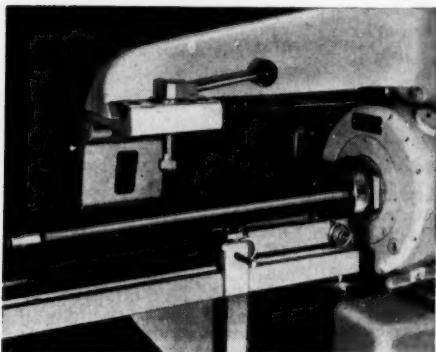
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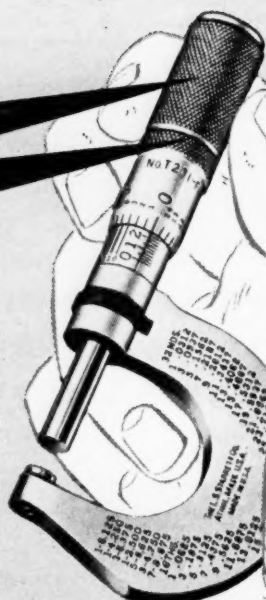
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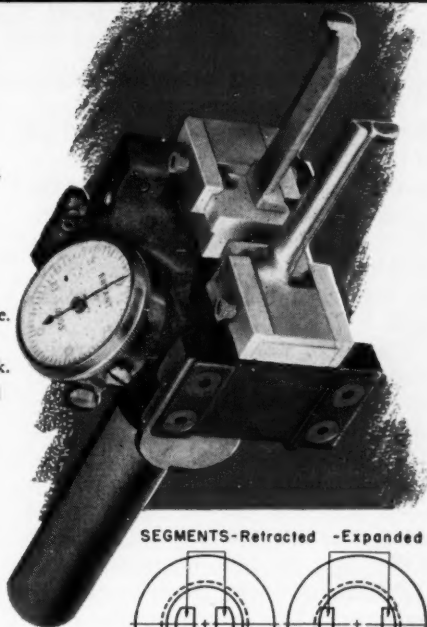
Actual checking of the groove is done by a pair of segments mounted on platforms, one of which is movable. A thumb lever collapses the movable, spring loaded segment so that the gaging members may enter the work. Release of the lever permits the segment caps to expand into the groove. The movable segment actuates a precision dial indicator which shows variation from basic size. An indication of groove roundness is obtained by rotating the work part on the segments, or by rotating the gage in the work.

OTHER IMPORTANT FEATURES: —

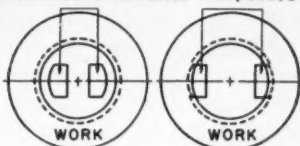
- Four pairs of segments cover standard "O" ring grooves from $\frac{1}{16}$ " to $4\frac{1}{2}$ " dia.
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Noise As An Accident Hazard

By H. H. SLAWSON

In which the author presents data pertaining to some of the discussions held at the recent Safety Congress in Chicago relative to the effect of industrial noises on the efficiency, health and safety of workers.

THE increasing attention which industrial management and medical science are giving to the effect of industrial noises on the efficiency, health and safety of the worker prompted the National Safety Council to include discussions of this new problem on the program of the Safety Congress, held recently in Chicago.

Speakers were agreed that noise costs money—\$4,000,000 a day in lowered efficiency of office workers alone, according to one estimate. They also agreed that the industrial worker whose nervous system has been affected by incessant noise all day is extremely prone to accidents. But, of more urgency, it was pointed out, is the trend to passage by state legislatures of statutes making impairment of industrial workers' hearing by factory noises compensable. If this movement gains ground, it will become a really serious industrial problem, the various discussions emphasized.

In Illinois such a law failed of passage in the 1953 session of the state legislature but action by the Illinois Federation of Labor at its October convention insures that the

effort to get such a law will be continued in that state, while similar efforts are anticipated in other states as well.

"If laws of this nature are passed," remarked one speaker, "it will, of course, open a vast new area for possible malingering and vague claims, and the expense for expert medical testimony and other costs will be terrific."

Walter F. Schultz, supervisor, Hygiene Engineering Division, Allis-Chalmers Mfg. Co., Milwaukee, Wis., called attention to the fact that a recent Wisconsin court ruling will have a tremendously significant bearing in establishing the validity of claims for hearing loss, thus warranting immediate attention to the importance of noise abatement.

Allis-Chalmers, Mr. Schultz asserted, feels that its recently established noise reduction program has made a good start and will ultimately arrive at control of the problem in his company's plant.

The first step to be taken in any abatement effort, he continued, in outlining the Allis-Chalmers program, is to purchase an inexpensive instrument, known as a sound met-

er. Making a spot check with this, areas can be located where the volume of sound exceeds the critical level and hearing impairment starts, he said. This critical sound level has been arbitrarily established by the acoustics engineers at 95 decibels, this being the term applied to the unit of measurement in this field. Later a complete and thorough sound level survey of the entire plant should follow and, thereafter, periodic surveys should be made, he suggested, to check any new noises introduced by new, repaired or transferred equipment.

Once the location and cause of the noises have been identified, steps to abate the excessive volume of sound should be taken, Mr. Schultz went on, and, from his account of what Allis-Chalmers did, you would be surprised at what can be accomplished by very simple means. In one instance, metal machine guards were producing excessive noise, shown to be unneces-

sary when wire guards were substituted that lowered the noise level at this machine by ten decibels.

Again, on a six-spindle automatic screw machine, mufflers were placed on air vises and air punch operations, resulting in lowering the sound level from 94 to 79 decibels. Tar was being applied to tumbling barrels and metal skid boxes, he stated, and from this a notable re-

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duction of "sound effects" is anticipated. Other specific high noise areas were being worked on at the time when he spoke and, although they present some difficulties, he was confident that satisfactory abatement of the noises could be accomplished.

Mr. Schultz related, also, how application of sound absorbing board to walls of the room where automatic office business machines are operated

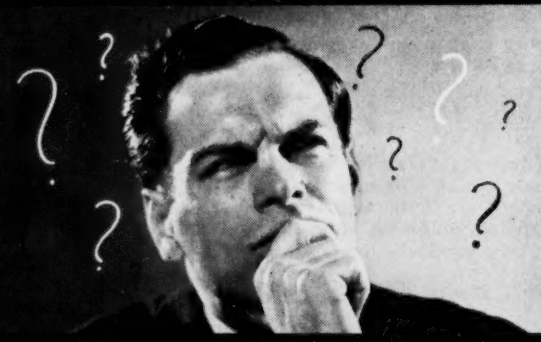
had resulted in one of the most significant reductions in noise anywhere around the plant.

Summing up this phase of the company's program, he declared that reduction in sound levels of from 8 to 10 decibels or more can be achieved "through good maintenance of machines and equipment," and that changes required can be made without any expenditure of unduely large sums of money.


Allis - Chalmers is also interested in the personal hearing conditions of all its employees, Mr. Schultz continued. An audiometric examination, he said, is a part of every pre-employment physical examination.

In 6,000 such examinations, 27 per cent were found to have some hearing loss and most of them did not know it, he stated. If a new man is placed in an area where the sound level is at the critical 95 decibel point, or above, his hearing is checked after the three-month probationary period, again after six months, and


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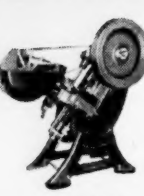
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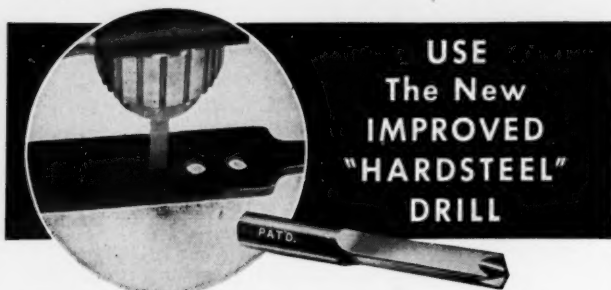
yearly thereafter. If the check shows a significant hearing loss the employee is provided with the best possible ear protection device suitable for his condition and he is also referred to the medical department's hearing specialist for further observation and study.

"We cannot find any justification," Mr. Schultz stated, "for transferring the worker to a less noisy

job unless his hearing loss has progressed despite the protective devices provided for him."

The audiometric room, he explained, is a part of the plant's first aid facilities. Here a fairly constant sound level of 50 decibels or less prevails. Technicians to operate the audiometer used for testing the employee's hearing are trained by the medical department.

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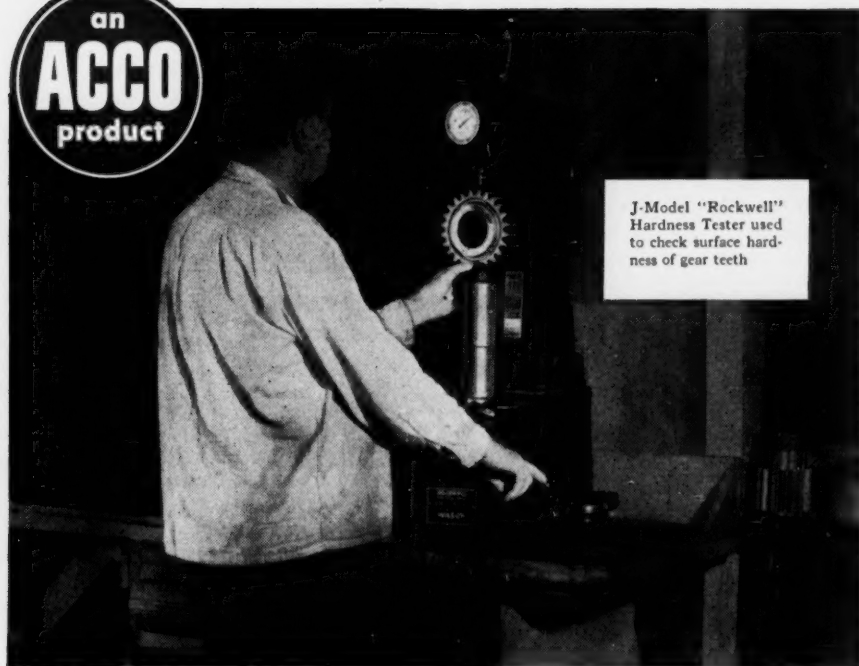
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Each new man's previous employment history is gone over with a view to bringing out jobs he has handled that were noisy in character. He is asked if he worked as a milling machine operator, a boiler-maker's helper, and so on, and his opinion is sought as to whether he thought it was a noisy job.

The man's military experience, if any, is important, he being asked what service he was in, what he did, and so on. Other questions are such as these: Do you hear over the phone? In a theatre? Do you use, or have



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you ever used, ear protection devices? Often or seldom? Was it a wad of cotton or of chewing gum?

Allis-Chalmers has no data, as yet, which would show the extent to which worker efficiency has been improved through the noise abatement program, Mr. Schultz said. If a firm feels incompetent to make its own noise survey, he suggested that outside services are available. Insur-

ance carriers or private consultants can be called on, he said. Much help can also be expected, he remarked, from the Industrial Hygiene Foundation which has underway studies of what has been done in the industrial world to abate noise. This, he said, will supply answers now lacking on many phases of the subject.

Further helpful suggestions for controlling noise when it exceeds the

critical level and becomes harmful were offered by an insurance engineer, E. G. Meiter, director, Industrial Hygiene Division, Employers Mutual Liability Ins. Co., Milwaukee, Wis. Quietness can be built into a machine, he declared, as is being demonstrated in construction of modern subway and streetcars, vacuum cleaners and other equipment. Attention should be given, he said, to badly worn-out parts, loose housings, rattling safety guards and other features of machines that produce unnecessary noise. Extremely noisy

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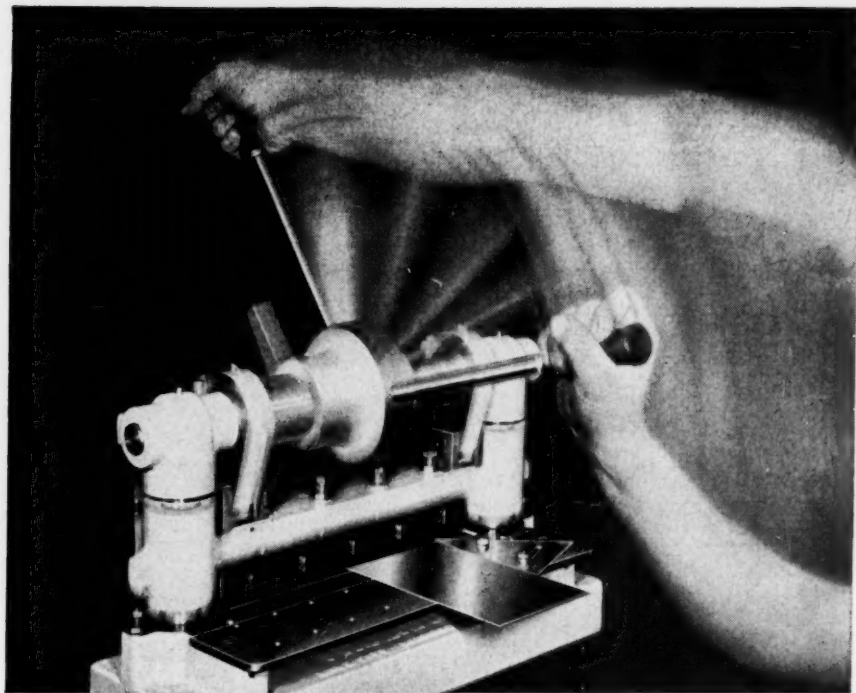


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operations can be isolated in enclosed rooms and made as automatic as possible, so that less close-up attention and exposure to the noise by attendants is required.

Mr. Meiter also discussed resilient sound absorbing materials, such as springs or rubber-like mats placed under a machine's base to prevent transmission of vibration or shock to

the floor, where the incessant pounding travels into workers' feet and affects the men's nerves. The merits of acoustic plaster, glass wool, plastic sprays and other materials for reducing sound were examined and he listed various types of ear protectors, plugs, muffs, and so on. These, he declared, should be considered in the same way that goggles are re-

quired for eye protection.

While the industrial noise hazard is recognized and engineering problems are understood, much research is still needed on medical problems involved, he said in conclusion. The Container Corporation of America had a very critical noise problem in the cutting room of one of their Chicago plants where fiberboard shipping cartons are made, Earl F. Ripstra, personnel manager, related in another discussion of noise abatement. Labor turnover there had been enormous, he said, with men quitting a day or two after being

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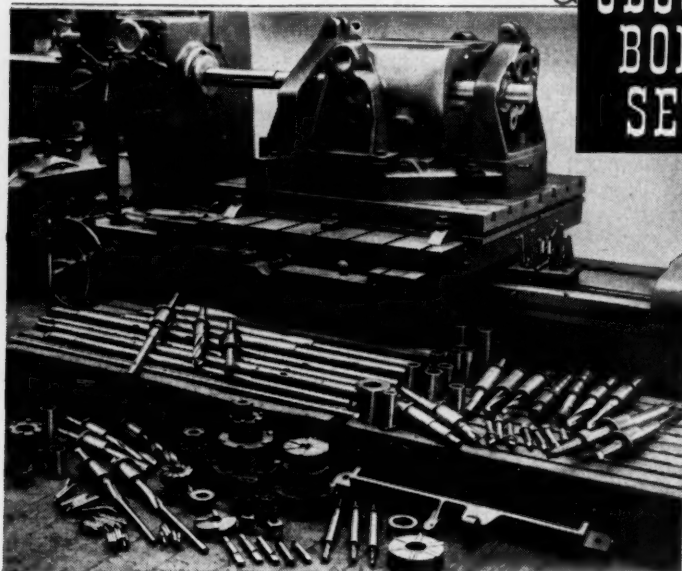
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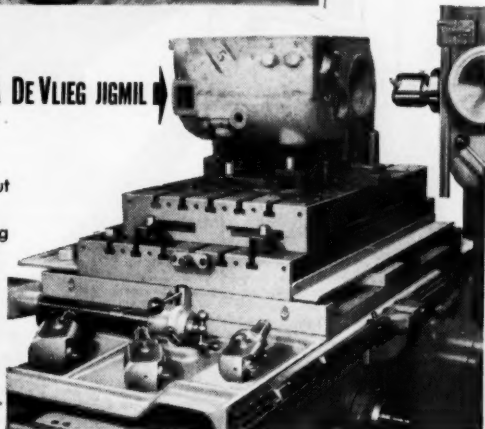


THIS PICTURE—taken in a well known machine tool plant illustrates the old method of boring turret lathe headstocks with a costly inflexible box jig and a mass of special tooling

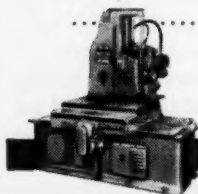
The Modern Method "JIGLESS BORING" THE SAME PIECE ON A DE Vlieg JIGMIL

- Eliminated expensive boring jig
- Reduced machining time
- Improved accuracy with a resultant cut in assembly costs
- Permitted the use of simplified tooling

If your shop is burdened with costly boring jigs and special tooling, it will pay you to investigate the DEVLIEG SPIRAMATIC JIGMIL!



Come to Detroit... see a practical demonstration of the JIGMIL Technique ...



DE Vlieg MACHINE CO.

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hired, simply because they could not endure the bedlam from air hammer strippers used in the operation.

After careful study of possible means for abating the tremendous din the problem was licked almost miraculously by suspending panels of noise absorbent material from the ceiling. This, Mr. Ripstra said, reduced the noise level 33 per cent and, in fact, exceeded all expecta-

tions. When a foreman, on top of a press, would shout down orders to his helper on the floor, the sound of his voice was completely absorbed in those baffles above and around the machine. So now the foreman has to climb down to the floor each time he issues an order.

The industrial accident picture was a bit brighter in 1952 than in 1951, the safety specialists at the

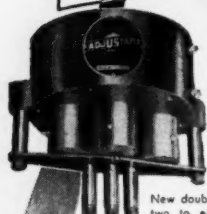
Chicago Safety Congress learned. Occupational fatalities in 1952 totaled about 15,000, compared with 16,000 in 1951. These deaths were at the rate of only 15 per 100,000 workers, in contrast to the 17 killed while trying to earn their daily bread in 1951. The disabling injury rate was also lower, it being 2,880 persons per 100,000 workers, compared to 3,270 in 1951.

Although indicating that some slight progress is being made in the accident prevention movement, the safety authorities did not feel that the figures warranted any relaxa-

...to protect your investment...
save time, money and labor!



U. S. drill heads are built for continuous use, with full anti-friction bearing construction, for high capacity thrust leads . . . precision-bored, outboard spindle support plate.

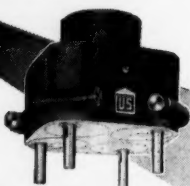


New double eccentric Adjustafix, two to eight spindles, for any adjustment. Eliminates the expensive change in set-up from job to job by simply changing the drill pattern plate and relocating spindles. Fully automatic lubrication for either horizontal or vertical operation.

The universal joint adjustable multiple spindle type, an adaptation of a universal joint adjustable spindle, is suitable for any sensitive drilling machine. Joints self-lubricating. Designed for quick change.

We manufacture all types of multiple spindle, fixed center, adjustable and lead screw tapping heads.

UNITED STATES DRILL HEAD CO.,
616-618 Burns St., Cincinnati 4, Ohio



Single eccentric type for equally spaced holes on bolt circles.



TO

GEAR MANUFACTURERS

Exclusively

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production schedules.

you have trouble meeting
precision tolerance specifications.

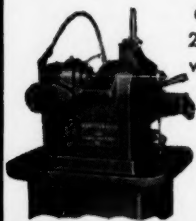
YOU should "read-up" on the HAMILTON line of Small-Gear,
Precision Hobbing Machines!

3

THREE PRECISION MACHINES to meet your every requirement.

HAMILTON No. 00

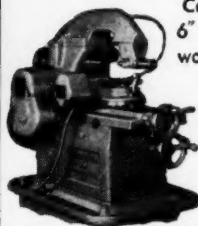
For the generation of spur
gears and pinions only.



Capacity:
2" O.D. of
workpiece.

HAMILTON No. 1

Hobs spur and spiral gears,
worm gears and worms (to
three thread), splined shafts,
gear sectors, and pinions.



Capacity:
6" O.D. of
workpiece.

HAMILTON No. 1-B

Generates any shape that can
be made on the No. 00 or the
No. 1 machines, plus bevel
gears and face gears.

Capacity: 6" O.D. of work-
piece (3" O.D. by 3/16" face,
for bevel
gears.)



Exclusive Greater range of hob spindle speeds: 109 to 1259
R.P.M. — 12 speeds.

Exclusive Speed, feed, indexing. Each can be selected independ-
ently. This, and wide range of hob speeds, adds flex-
ibility; reduces set-up time; gives quick selection of
speed and feed to suit material and gear size.

Exclusive Alignment and trueness of work and hob spindles are
held to within .0002".

Exclusive Generates gears from 3 teeth to 1200 teeth.

Exclusive Accumulative error of not more than .0002"

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tion of the drive to make workers accident conscious.

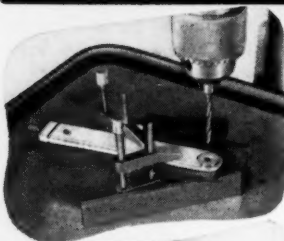
In the sessions of the Safety Council's machine shop, power press, forging and other sections, accident hazards ranging from machine guarding to proper illumination and heat relief were examined by experts in the subject involved. Round table sessions in which the safety directors of many large industrial firms

exchanged experiences and recounted their methods for controlling trouble that leads to accidents were exceedingly helpful.

P. F. Bunker, safety director of the General Motors Frigidaire Division, let the conference in on one secret of his success in reducing accidents at the Dayton, Ohio, plants under his jurisdiction. When he took over the safety post in 1946, he re-

lated, he organized an executive safety policy committee, with Frigidaire's general manager as chairman and including the chief engineer and every other top executive whose regular duties make him a party to plant accidents. At the start, this committee, meeting on the second Tuesday of each month, would go over the written reports of the previous month's accidents. Soon, however, Mr. Bunker realized that the bare figures "seemed to put this committee of our top brass to sleep." Therefore, three Graflex cameras

Drill Holes within .001" Accuracy with the Master Optical CENTER LOCATOR



Speediest—Simplest—most accurate method of locating centers and drilling holes. For a decade, machinists have been drilling and spacing holes with the Center-Locator to within .001". Just the thing for drilling round holes in thin material . . . avoiding drill run-outs . . . counter-boring holes with an ordinary drill. Makes your drill press do the work of a jig boring machine!



Easy to operate: Simply lay out your work with a height gauge, locate center through the powerful magnifier, then replace the magnifier with any of 16 drill bushings furnished.



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OPEN BACK INCLINABLE POWER PRESSES



15 bench and floor models 3 to 18 tons capacity. Left: Model 59 Electromatic 18 Ton Press with exclusive Solenoid operated clutch.

In an unusually short time Famco has become the nation's leading manufacturer of small O. B. I. presses. In addition to offering the largest line of precision-built presses on the market, Famco recently introduced the revolutionary Electromatic Clutch. This feature, built into its 13 and 18 Ton models, utilizes the instant action and increased efficiency of an electrically operated 9-point jaw clutch. Every care has been taken to make this the most rugged, highest quality line available. For complete details see your Famco Dealer or write for free Catalog.

FAMCO MACHINE COMPANY

3122 SHERIDAN ROAD • KENOSHA, WISCONSIN

AIR PRESSES • ARBOR PRESSES • BAND SAWS • DRILL PRESSES
FOOT PRESSES • POWER PRESSES • SQUARING SHEARS

were purchased and the seventeen men on his safety staff were trained to use them at accident scenes. Slides showing conditions surrounding the accident are now shown at the policy committee's conference where they are gone over like a surgeon examines an X-ray. And there's no longer any dull moment in those meetings.

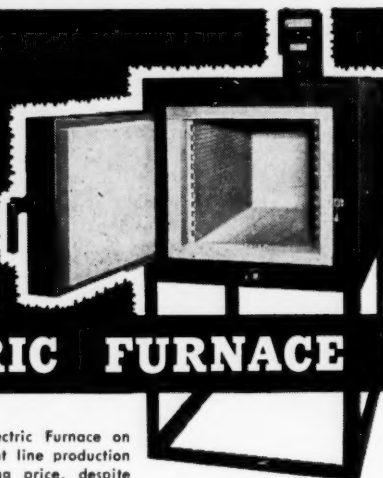
"Buying those cameras," said Mr. Bunker, "was the best thing we ever did. Shop foremen know where the pictures are to be shown and they don't like it, because it may reveal where the foreman was at fault."

Later, he said, the general manager suggested that pictures be made of hazardous conditions spotted by his safety men around the plant. So

the staff goes out, armed with the cameras and flash bulbs but minus any films. Fifteen minutes after the supposed pictures are made, he said, a return visit to the spot would show that the objectionable condition which existed has been corrected.

In addition to the seventeen men, Mr. Bunker has four women on his staff. One man specializes in punch press accidents, another cabinet-making, and so on. Four are eye protection experts, who also handle the room where eye protection supplies are ordinarily stocked.

Frigid-
aire's eye protec-



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ELECTRIC FURNACE**

1 SAVE with a Lucifer Electric Furnace on **FIRST COST**. Our straight line production permits economical selling price, despite use of highest quality materials throughout. Check costs on other furnaces . . . feature by feature . . . you'll save money on the Lucifer Electric Furnace **EVERY TIME**.

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6x 6x12"	\$467.00	\$548.00
9x 9x18"	647.50	764.00
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Complete with 100% automatic electronic controls.

WRITE FOR FREE literature, specifications and price list of Lucifer Furnaces in wide range of sizes—top loading and side loading types. Engineering advice without obligation. Write, wire or 'phone today.

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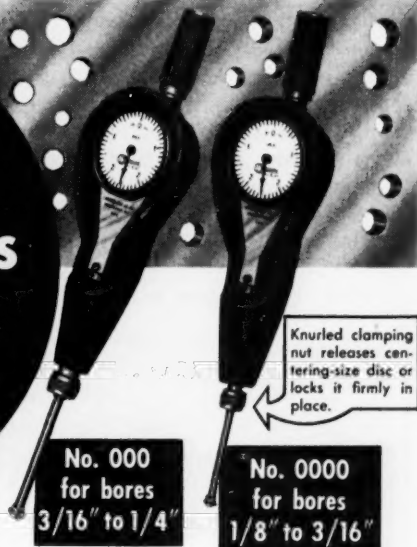
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NOW!—DOWN TO 1/8"

Two New Dial Bore Gages for measuring 1/8" and 3/16" bores



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For

These two new STANDARD developments extend the effectiveness of STANDARD Dial Bore Gages to quick, accurate, quantitative inspection of bores down to as small as 1/8" diameter. They utilize the "centering-size disc" principle, tested-in-use with similar but slightly larger gages.

- * Hold settings positively
- * Give reliable repeat readings
- * Sapphire tipped gaging plungers and chrome-plated centering-size disc insure long gaging life
- * High visibility dial graduations of .0001 are easy to read
- * "Capstan" adjusting disc facilitates adjustment when zeroing instrument.

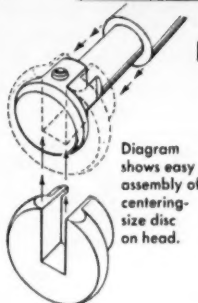


Diagram shows easy assembly of centering-size disc on head.

EASY "SIZE CONVERSION"

Conversion to various sizes in the over-all range of the gage is accomplished by the quick interchange of centering-size discs on the same head simply by turning the knurled clamping nut. Positive interlocking action insures holding set dimension. Centering-size discs are furnished to fit bore dimensions specified by the user, or in complete sets.

AVAILABLE AS ONE-DIMENSION OR FULL-RANGE GAGE

When either gage is supplied with set of discs, any dimension within its over-all range can be measured with a tolerance up to plus or minus .002".

STANDARD Dial Bore Gages now in 10 sizes covering range from 1/8" to 16"

Write for full details

EASE OF OPERATION



Gage is entered at an angle to allow extended plunger to clear the bore, then rocked to cause plunger to pass a square position while noting minimum reading on the indicator.



tion program saves an average of 60 eyes a year, Mr. Bunker stated. Men at first objected to goggles, but, after foremen were required to set the example in wearing them and a few cases of how glasses had saved a man's eyes were well publicized, the opposition to goggles ceased. All goggles are fitted on prescription orders so that they are adapted to the man's eye condition and his work.

The safety department, he went on, is responsible for helping to create the "homey" feeling among employees which is sometimes nonexistent in some large industrial organizations. When an employee enters a hospital the safety department immediately loans him a radio, sending along with it an encouraging letter. Each week, while the man is in the hospital, he is given a carton of cigarettes.

When fatalities occur the man's foreman is required to notify the family in person, taking with him a safety man to explain just how the accident happened and also a registered nurse from the medical department, in case her services might be needed with the bereaved family.

"It's all a part of our constant striving," Mr. Bunker concluded, "to make every employee feel that somebody really cares."

One of the most helpful suggestions heard during the Chicago Safety Congress was the admonition



**You're Never Seen Anything
Like This C-30**

Automatic High Speed

PRECISION FLEXOPRESS

One "Flexopress" replaces five conventional type presses — saving up to four-fifths of the floor space formerly used. A NEW industrial technique for greater volume and quality at HIGH SPEED.

The ram on this high-speed Automatic Stamping Machine is contained on a multiple of ball bearings — operating in hardened and ground tool-steel raceways — with positive alignment. Do it Better! Do it Faster! Market your product cheaper with a greatly increased profit margin.

Hold a "pat-hand" over competition for production tooling with this C-30 Automatic Precision Flexopress.

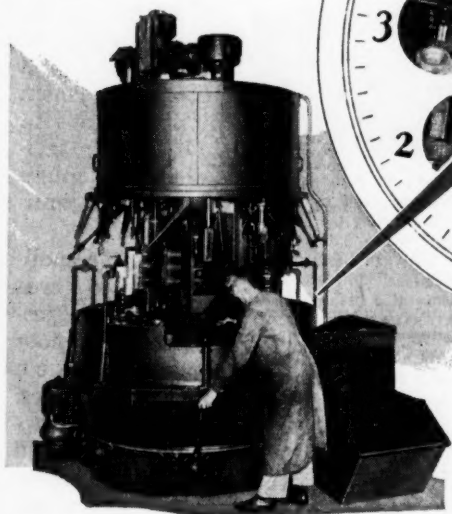


30 TON

**PRECISION WELDER
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138 E. McMICKEN AVE. CINCINNATI 10, OHIO

Seconds Count.



*Time is an Important
Element in Profitable
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BULLARD MULT-AU-MATIC

Hour after hour, the Bullard Mult-Au-Matic Method is proving its production capabilities in plants the world over in many and diversified industries. Years of constant development and improvement have proved the Mult-Au-Matic Method as a key unit for accurate and efficient repetitive production.

Seventy-three years of machine tool "know how" and craftsmanship have been skillfully combined in the Bullard Mult-Au-Matic—a machine that reduces manufacturing time and makes seconds count for profits. We invite your inquiries—write to your nearest Sales Office, Distributor or

{ Type "D" — 8"-12"-16" with 6 or 8 spindles
Type "D" — 16-23" and Type "K" — 6 spindles
and 6 twin spindles — 8 spindles and 8 twin
spindles }



"Don't hire an accident," offered by John Cruickshank, chief engineer, Federal Insurance Co., New York City. Mr. Cruickshank was discussing the thought that inspection of physical facilities to spot accident breeding hazards will not, alone, prevent accidents. Much of the problem, he declared, involves the human element. For instance, when men fall off ladders, the inspection

should not stop at examination of the ladder's condition. In one aircraft plant three men in succession sustained fractured skulls and one a broken back in falls from ladders that were in O. K. condition when the company inspected them. But not until after the accident was it discovered that one victim was a diabetic, subject to dizzy spells, and one of the others a bench worker un-

accustomed to high places.

"What really happened," he said, "was that the employment department hired three accidents that might have been anticipated."

"Keep a spoilage record," was his next suggestion. On a floor plan, broken down into zones, he elaborated, pins should be stuck, marking where a machine had been damaged, a truck overturned, and so on. Then, if a lot of pins appear in one spot on the plan, it would indicate the need for investigation to determine why this spot produces trouble.

LEVIN[®] MICRO-DRILL PRESS FOR VERY SMALL HOLES DOWN TO .002"



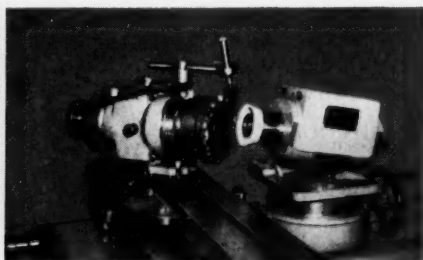
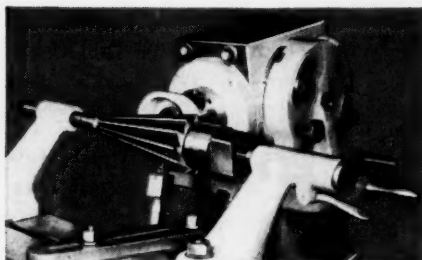
Designed to hold small drills in precision collets, thus overcoming the difficulty of making a drill run true as when held in a conventional drill chuck. Absence of a sliding quill guarantees maximum sensitivity with fingertip control. A mounted $\frac{1}{8}$ " capacity chuck can also be used.

Send for Catalog L describing Micro-Drill Press, full range of collet sizes, accessories and other precision tools

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Specify THIS NEW **POPE** SUPER PRECISION
1 HP, 3600 RPM MOTORIZED TOOL AND CUTTER GRINDER
CLEARANCE ANGLE SWIVELLING HEAD

With Angular Adjustment In A Vertical Plane



TIME AND MONEY SAVING FEATURES:

1. Cup wheels, generally considered best for cutter grinding, can be used for practically all clearance angles on this new head.
2. Cup wheels produce a cutting edge on tools that lasts longer because it is stronger.
3. The tooth rest remains on the center line of the cutter for practically all grinding on centers or in the work head.
4. Most cutters and reamers can be ground all over with one set-up, using the swivelling table and Pope tilting head. The usual second and third set-ups are no longer required.
5. All clearance angles read directly in degrees from the scale provided on the head. Mistakes on clearance angles are avoided.
6. The right clearance angle is assured on tools difficult to grind, such as slab mills, taper reamers, angular cutters and form tools.
7. 3600 R.P.M. — one wheel speed — safe for all wheels generally used on cutter grinders. Heat checking of cutters is virtually eliminated.
8. The operating ease and convenience of this new Pope Head with the angular adjustment in the vertical plane saves you time and money on every tool you grind.

ASK FOR COMPLETE SPECIFICATIONS

No. 96

<i>Specify</i>	POPE	POPE MACHINERY CORPORATION
		<small>Established 1920</small>
		301 RIVER STREET • HAVERHILL, MASSACHUSETTS
PRECISION SPINDLES		

"Keep a complete list of equipment," he continued, recalling that he once asked a plant manager how many motors there were about the place. The manager said there were 480, but to this list Mr. Cruickshank, after an inspection, added another hundred he had found in water coolers, portable floor machines and other equipment overlooked by the manager.

During one August, he added, his company was involved in five fires, all in factory refrigeration equipment that had never been serviced by the cleaning crew. Eventually the overloaded machines had started flash fires in the dust accumulated within them.

"Plug it in and forget it," the remark often heard about appliances, he remarked dryly, might well be in-

cluded on the list of "famous last words." A closely scheduled maintenance program covering all equipment would, he declared, prevent the results of this indifference to many prevalent hazards.

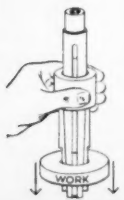
It also might be well, Mr. Cruickshank went on, to log the mileage on elevator cables. They are designed to carry, maybe, 180 persons or a loaded truck, but not forever. Cables wear out and knowing the mileage will help determine when a replacement is in order if a possible accident is to be avoided.

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EXPANDING MANDRELS



Tap, it's on



Tap, it's off!

**ONLY 11 TOOLS
PROVIDE EVERY
SIZE ARBOR
from 3/8" to 7"**

Requires no Arbor Press —

Hardened and Precision Ground
for Permanent Accuracy.

Perfect concentricity
within .0005".

Permits heavy cuts without
chattering or distortion.

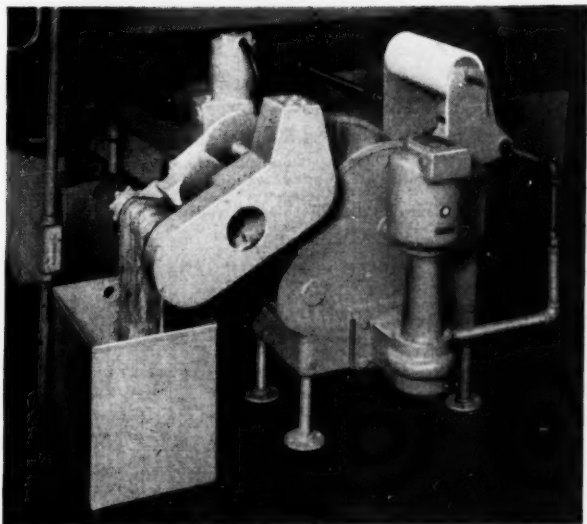
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DOUBLE CLEANING ACTION



New **BARNESDRIL** Kleenall Units separate both magnetic and non-magnetic particles from metal-cutting fluids. As a result, non-ferrous materials as well as abrasive matter are removed to give you cleaner coolant supply than ever before.

Dual cleaning action of **BARNESDRIL** Kleenall Filters provides low-cost volume cleaning by magnetic separation, and positive precision cleaning by a preselected filtering media of specific porosity, to obtain complete removal of all contaminants both magnetic and non-magnetic.

Check with your **BARNESDRIL** representative today. Let him show you the efficiency and savings you can obtain with a **BARNESDRIL** Kleenall Filter.

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BARNES DRILL CO.



860 CHESTNUT STREET • ROCKFORD, ILLINOIS



**STANDARD DIMENSION
STUB SCREW MACHINE
REAMERS**

Finished blanks in stock: Sizes No. 00 to No. 23 to grind from .0600" to 1.0100". Tolerances unless otherwise specified plus or minus .0001".



**BUOL SPECIFICATION
STUB SCREW MACHINE
REAMERS**

For larger type Gridleys, Chucking Machines, Turret Lathes, and Hand Screw Machines. Also used extensively for second operation work.

Finished blanks in stock to grind from .0930" to 1.2500". Tolerances unless otherwise specified plus or minus .0001".



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Backed by 27 years of manufacturing experience on reamers exclusively, we also make Die Clearance Reamers, Helical Taper Pin Reamers, Carbide Tip Reamers, and Special Reamers to your blue print specifications and requirements.

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MANUFACTURERS' AGENTS: A few exclusive territories still open. Write us.

THE BUOL MACHINE CO.
MEADOW & PARK STREETS
NEW BRITAIN, CONNECTICUT

Last on his list of things to do, in addition to routine physical inspection, was "Keep hammering at the foreman." "Never take the responsibility for accidents away from your foremen," he advised. "Never accept his alibi that 'It was inspected just yesterday.' Make him realize that inspection is not everything in accident prevention. If a man is 'accident prone' on the job assigned to him, he should, for his own safety's sake, be shifted to another job."

Color Welding Film

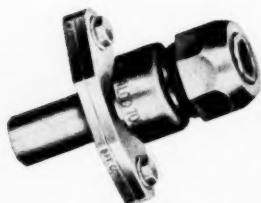
A demonstration of the latest techniques in the welding of aluminum pressure vessels is featured in a 16-mm. 28-minute color welding film released by Aluminum Company of America. Entitled "Welding Advances with Aluminum," the film offers a comprehensive description of welding aluminum using both the tungsten arc and consumable electrode methods. Outstanding illustrations of the use of these inert gas methods are presented to demonstrate some of the many jobs they have simplified in manual, automatic, and semi-automatic welding of aluminum. The basic concepts of both tungsten arc and consumable electrode welding are explained in an animated sequence.

Also described in the film are the services of Alcoa's research and process development facilities which are offered to customers for the solution of their welding problems. In the film, the viewer is taken on a brief tour of these facilities, which include the Aluminum Research Laboratories and Alcoa's Joining Process Development Laboratory. The film is available for group showings by writing on business letterheads to Aluminum Company of America, Motion Picture Section, 818 Alcoa Bldg., Pittsburgh 19, Pa.

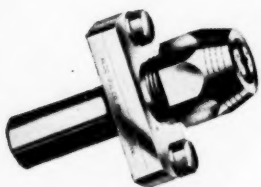
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Faster



ALCO RELEASING TAP HOLDER
Cuts perfect threads with no tap breakage with even wear on all parts of the tap.



ALCO TAP HOLDER (Non-releasing)
A spring in the shank moves holder forward when driving, and recedes it when spindle is reversed.



ALCO DRILL CHUCK
Holds drills, reamers, centers, spotters, counterbores, countersinks, etc. without use of bushings.

Taps and Drills are held rigidly without the use of bushings. Alignment feature of the holders insures concentric drilling and tapping, producing better work faster.

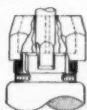
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COMPLETE CATALOG

**THE
ALCO TOOL
COMPANY**

ALCO DRIVING BLOCKS On tough materials, or when using excessive feeds, use these Alco Driving Blocks which fit into the drill chuck or tap holder. Slippage is impossible.



DRIVING BLOCK



DRIVING BLOCK GROWER
HOLDING SQUARE END
OF TAP



FLAT GROUND
ON END OF
DRILL

ALCO TOOLS

52 BIRDSEYE STREET, BRIDGEPORT, CONN.

February, 1954

MODERN MACHINE SHOP 185

NEW TAFT-PEIRCE *Superpower* PERMANENT MAGNET CHUCK



PROVIDES GREATER WORKING SURFACE

An entirely new design, the Taft-Peirce Superpower Permanent Magnet Chuck has 15 to 20% less height than other makes. Provides more clearance between wheel and chuck.

Stronger, yet flexible, too. Just push or pull lever to vary power anywhere from maximum to minimum. Permanently magnetized, power won't fade with use.

Available in range of sizes. Write for bulletin, today.

Additional poles provide greater working surface.

Ideal for surface grinders, these T-P Chucks are also effective on light millers, planers, shapers. The portable smaller sizes speed hand-finishing, burring, scraping, polishing, inspection operations.



THE TAFT-PEIRCE MANUFACTURING COMPANY • WOONSOCKET, RHODE ISLAND

**Much Faster
and More
Flexible**

When Automatic Differential Up-feed and Conventional Crowning were added to the Red Ring Model GCU, shaving speed, flexibility and economy were all significantly increased.

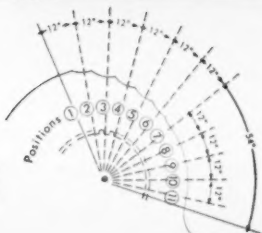
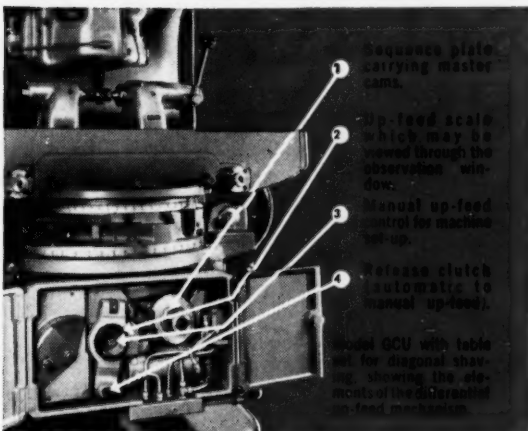
AUTOMATIC DIFFERENTIAL UP-FEED

This efficient device provides for the first time an automatic cycle applicable to both diagonal and conventional shaving. This cycle is controlled by an eleven-position master cam. Included are backlash take-up, infeed cutting strokes, idling strokes and return to unloading backlash. The entire cycle or any portion of it may be used depending on job requirements.

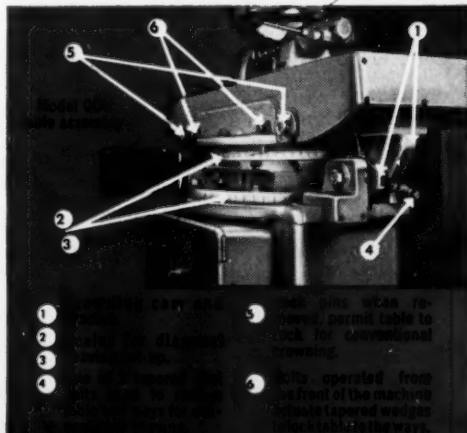
The cam itself does not actuate knee movement. It is strictly a stepped gaging device. Consequently every knee movement is positive, extremely precise and very fast. No danger of operator's errors. Perfect accessibility for fast loading and unloading.

CROWNING

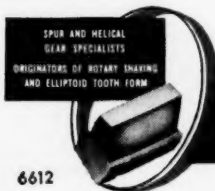
Gears being shaved conventionally can be crowned by rocking the table about a central pivot during the automatic cycle. The cam controlling the rocking movement is located on table centerline to avoid any tendency to twist. This device also provides for taper shaving.



One of the two control cams carried by the feed unit sequence plate.



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Bulletin S53-7
for full details.**



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6612

February, 1954

MODERN MACHINE SHOP 187

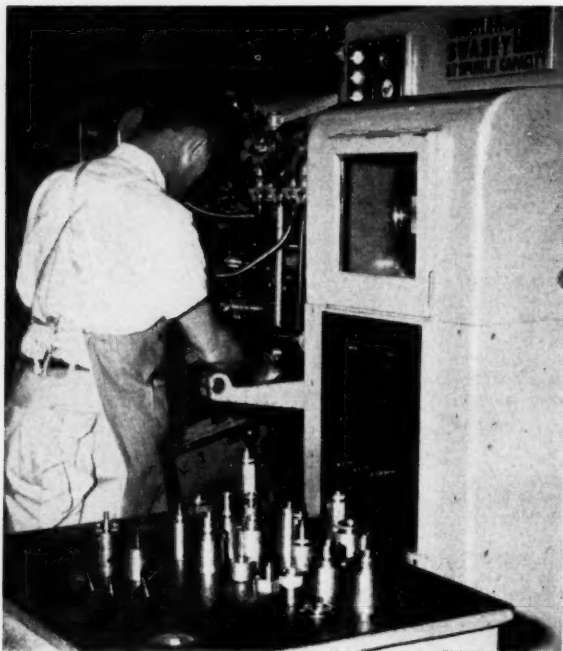
Set-Up Slugs Expedite Tooling For Automatics.

By B. G. LAWRENCE

This article explains how a large temperature control valve manufacturer has reduced set-up time on its multiple-spindle automatics by using a completed part as a "set-up slug" when a repeat job is to be run.

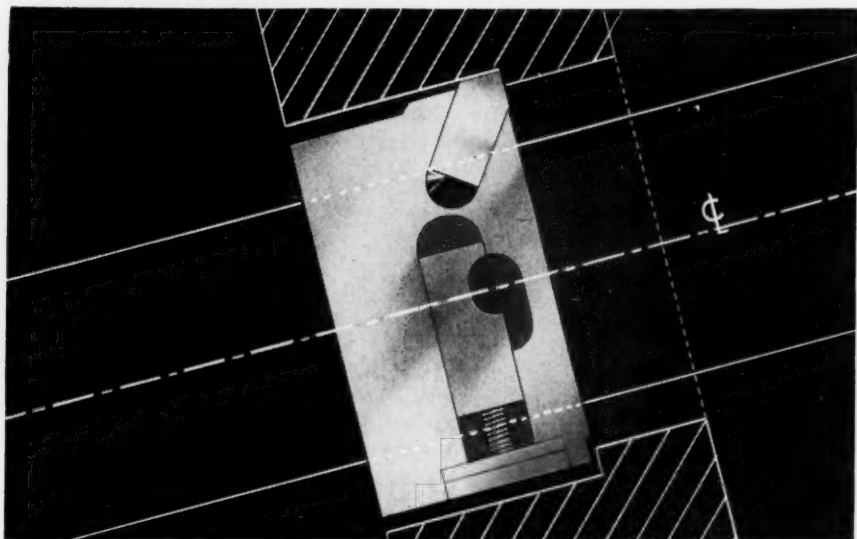
THE Fulton-Sylphon Division of the Robertshaw-Fulton Controls Company in Knoxville, Tennessee, makes excellent use of "set-up slugs"

to reduce set-up time on its Warner & Swasey multiple-spindle automatics which produce parts to close tolerances in lot sizes averaging 1,000 pieces. This well-known company manufactures over 3,200 different models of temperature control valves for use in domestic, industrial, and armed forces applications. Consequently, jobs must be released in small lots in order to keep inventory down.



The Fulton-Sylphon Division of the Robertshaw-Fulton Company has reduced set-up time on its Warner & Swasey multiple-spindle automatics by using "set-up slugs." Shown are a few of the many different types of set-up slugs the company is now using.

**Get fast, positive line boring
accuracy for 2½" to 17" dia. with . . .**



DAVIS SINGLE CUTTER MICROMETER ADJUSTABLE BLOCKS

HERE'S the way to boost efficiency on general purpose jobs that demand rigidity and a wide range of cutter adjustments.

In addition to regular line boring with either standard or special bars, Davis tools with the exclusive adjustable feature are easily adapted to counterboring, undercutting, grooving, facing or chamfering. Block and cutter adjust as a unit to assure full cutter support at all settings.

Made of high grade tool steel, hardened and ground, the blocks can be furnished with High Speed Steel, Cobalt, Stellite, Tungsten Carbide tipped or Tantalum Carbide tipped cutters.

For details, write for bulletin No. 602.

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Builders of plain and micrometer adjustable block type boring tools; line boring bars; special boring tools; car wheel boring tools; planer, vertical boring and turning mill tools; Quick Change arbors and sleeves.

The multiple-spindle automatics produce the bellows components from corrosion - resistant material such as stainless steel, Monel, aluminum bronze, and phosphor bronze—material which is difficult to machine. Material of this nature is extremely abrasive, necessitating frequent resharpening and replacement of cutters. These factors made it im-

perative that Fulton-Sylphon reduce its turning cost factors wherever possible. The speeds and feeds on hard-to-machine materials, such as used by the company, are fairly well fixed. The only opportunity, therefore, for a reduction in time and consequent cost was in the set-up time of the machine.

This the company accomplished

by using the "set-up slug."

This set-up slug is actually a completed part which has not been cut off from the stub end of bar stock. Examples of a few of the wide variety of different parts can be seen in the accompanying illustration. When a repeat job is to be run, the set-up slug is inserted in one of the collets and indexed to each of the five positions. The cutters in each station are in turn set to an approximation of the finished part. After the machine is loaded with bar stock, finished size on the parts can be quickly obtained by the micrometer adjustments

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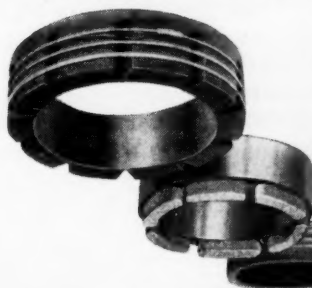


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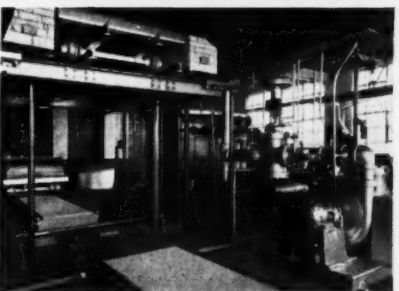
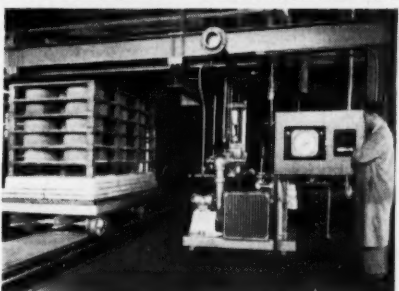
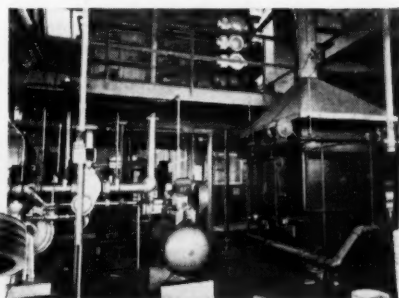
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on the cross slides. Feeds are instantly obtained by setting the three feed dials, and the stroke lengths can be quickly obtained by adjustments on the longitudinal and cross slide quadrant controls.

On a recent run of 2,200 pieces, Fulton-Sylphon reports that the aluminum bronze parts were produced at the rate of 62 seconds per piece on an automatic. In addition, the company reports that tolerances were held within 0.003-inch total indicator reading, and one particular diameter was finished to 8 micro-inches. This is just one example of the time savings Fulton-Sylphon has obtained by combining the "set-up slug" technique with Warner & Swa-

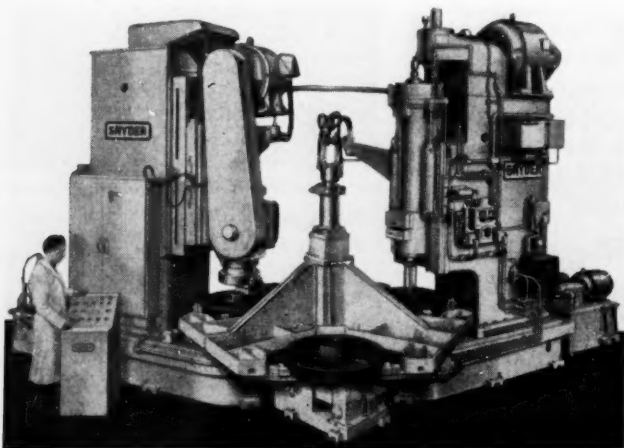
sey multiple-spindle automatics. The overall records of the company indicate that the set-up slug method has enabled it to reduce set-up time an average of 40 per cent on a wide variety of threaded parts. On parts which are not threaded, the company claims that the set-up time can be effectively reduced as much as 50 per cent.

For further information on any product mentioned in this issue—use the **READER SERVICE CARDS** opposite Page 404.

Special Machine Tool for Flywheel Housings

THE accompanying illustration shows an automatic vertical index boring and facing machine developed by Snyder Tool & Engineering Co., Detroit 7, Mich., for boring and facing hubs on railroad car wheels. An important advantage of this special machine is that two operations, boring and facing, are successfully combined, thus cutting down the amount of handling required to process large, heavy cast-

iron railroad car wheels. The machine has three major components; namely, a vertical spindle column for the facing operation, a boring head, and an indexing turntable with three work-holding positions which are 120 degrees apart. These components are mounted on a welded-steel base rigidly braced and normalized. Four carbide tips, two round for roughing and two square for finishing, are used.



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To broach the lugs and cross holes of a universal joint, American engineers designed a combination tooling set-up on a standard American T-10-36 3-way machine.

Arranged with 3 stations, the machine surface broaches 3/16 stock off the inside and outside surfaces of the lugs at the center station; or broaches 1/32 off the I. D. of the lug cross holes at the two outer stations.

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Huge Casting Repaired By SIGMA Welding Process

By E. R. STANSON

In which the author describes an interesting application of the shielded inert gas metal arc welding process in repairing a 6,500-lb. aluminum casting.

THE highly localized energy of the relatively new SIGMA (shielded inert gas metal arc) welding process was a distinct asset recently at Airline Engineering and

Welding Co., Hawthorne, Calif., where it was used to fill in surface cavities caused by a machining accident in the largest aluminum casting ever produced west of the Mis-

issippi River. The casting itself, a huge tool plate, weighed 6,500 lb. It was of No. 356 aluminum alloy, measured 15 feet 2 inches long x 6 feet 1 inch wide, and had integral members 10 inches deep and an



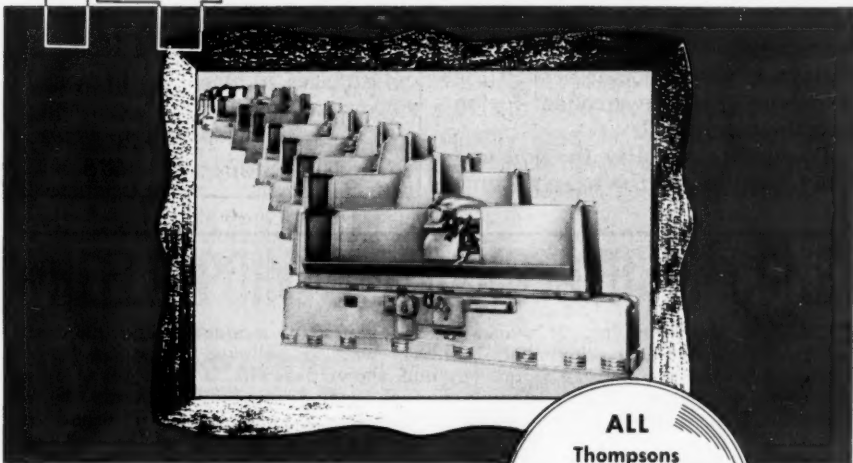
Repairing the injured surface of a 6,500-lb. aluminum casting, using the SIGMA welding process to avoid the necessity of preheating. The casting is resting on the bed of the truck that delivered it to the welding shop.

LOOK CLOSELY AT THIS PICTURE

OF GRINDER PRODUCTION AND SEE WHY...

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After twelve years continuous manufacture of precision ground products, ten Thompson Surface Grinders proved so efficient and economical that this manufacturer ordered four more machines.

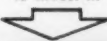
Thompson Grinders are available in a wide range of types and sizes from 6" x 18" to 72" x 384" to meet all production, special or tool room grinding requirements. The Thompson line includes machines from giant Hydrial Way Grinders to automatic Truform Jet Blade Contour Grinders, Dual Rotary Grinders and Broach Grinders.

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Grinders**



average surface plate thickness of 3 inches. A broken machine tool had gouged out several large pockets in the surface of the plate.

With conventional welding methods, a preheat job on the huge tool plate would have been necessary. This would have been a tremendous undertaking and far beyond the capabilities of most small welding shops. However, with SIGMA equipment, the intense localized energy characteristic of this process was enough to create sufficient heat in the weld area to secure excellent fusion with the base metal.

To further simplify the job and avoid handling of the huge casting,

it was repaired while still on the truck that delivered it. Some 65 lb. of aluminum alloy welding rod were used as fill metal. Only a minimum of surface grinding was required to smooth the repaired areas flush with the remainder of the tool plate surface.

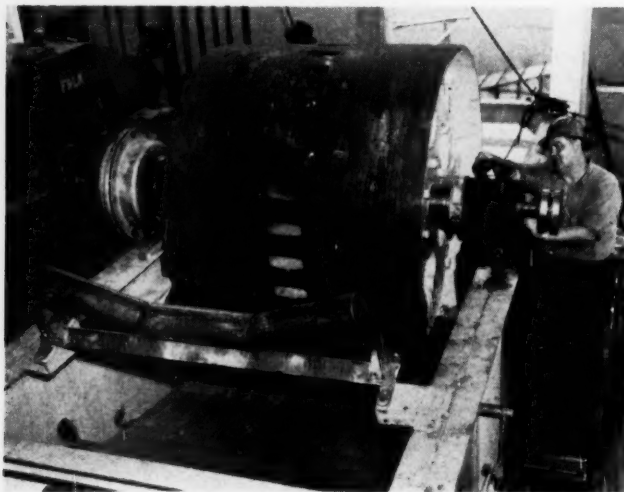
The casting itself was designed and produced by Pioneer Tool Engineering, Inc., El Segundo, California.

For further information on any product mentioned in this issue—use the READER SERVICE CARDS opposite Page 404.

King Size Magnetic Pulley

STEARNS Magnetic, Inc., Milwaukee manufacturer of magnetic separation and power transmission equipment, has built what is believed to be the largest electro-magnetic pulley in the world. The unit, shown herewith, is 60 inches in diameter with a 48-inch face. It is installed in the Oak Creek Power Station operated by the Wisconsin Electric Power Company and is used to magnetically remove all tramp iron

from the coal used at Oak Creek so as to prevent damage to expensive crushers and other equipment. An outstanding feature of this pulley is the lagging which is a thin, tough strip of material with firmly embedded granules that is held on to the face of the pulley with an adhesive material which is said to create a bond of unusual strength and eliminate belt slippage in conveyor systems.

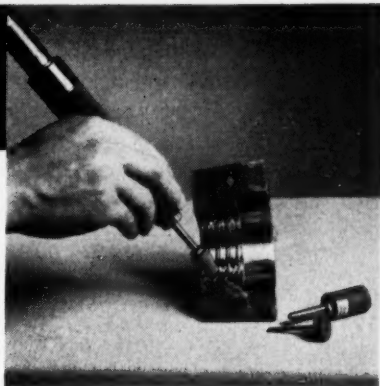


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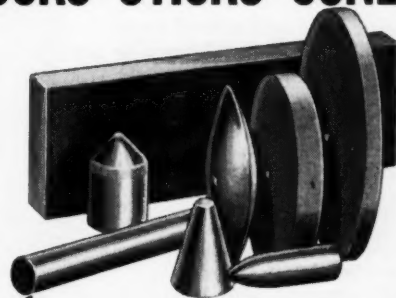
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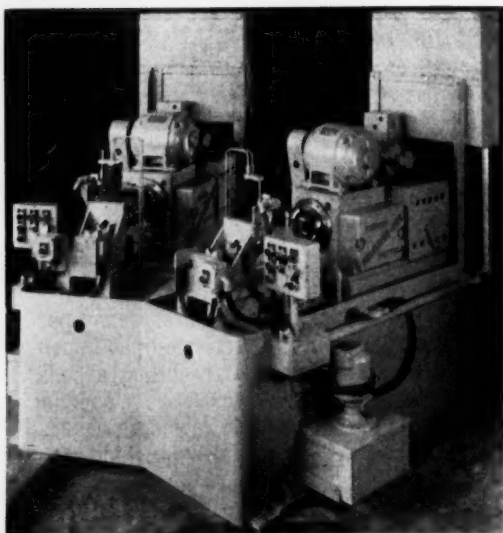
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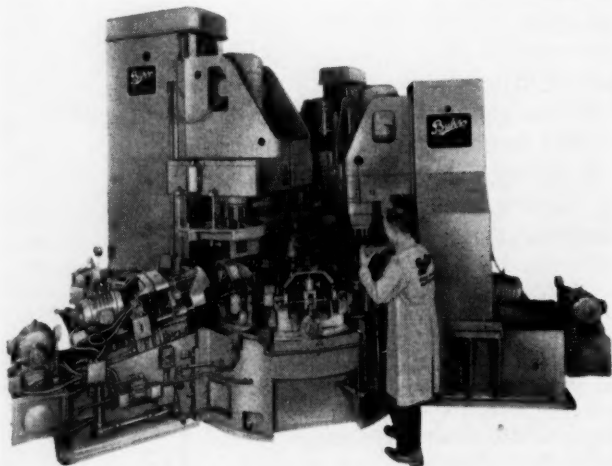
Special Machine for Threading Transmission Shafts



ILLUSTRATED herewith is a special machine for threading a main transmission shaft with a 7/8-16 U-2A thread 11/32-inch long, at a rate of 400 parts per hour. A recent development of the Murchey Division of The Sheffield Corp., Dayton 1, Ohio, it incorporates two "Precision-Pak" self-controlled threading units, each having automatic cycling, precision lead screw, smooth, accurate spindle travel, and fast spindle return. The units are mounted on a specially-constructed double welded base complete with built-in coolant pumps. They are positioned on an approximate 45-degree angle so that both can be operated at one time. An air-operated collet type fixture in line with each threading unit is used to hold the part during threading.

Special Machine for Boring and Facing Wheel Hubs

THE special machine tool illustrated herewith built by Buhr Machine Tool Co., Ann Arbor, Mich., for a large automotive manufacturer, allows for the processing of two different models of flywheel housings simply by exchanging tools. The machine comprises a 5-way automatic 6-station fixture arranged with hydraulic clamping and mounted on a 60-inch diameter automatic index table. Forty-two operations are performed on each flywheel housing at the rate of 100 pieces per hour at 100 per cent efficiency—21 drilling, 8 chamfering, 2 reaming, 10 tapping, and 1 boring operation for each housing.



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February 4

The Instrument Society of America, Annual Regional Conference, Statler Hotel, New York. Society headquarters located at 921 Ridge Ave., Pittsburgh, Pennsylvania.

February 15-17

American Management Association, Personnel Conference, Palmer House, Chicago. Association address: 330 W. 42nd St., New York 36, New York.

March 2-4

American Machine Tool Distributors Association, Spring Meeting, Boca Raton Hotel and Club, Boca Raton, Fla. Association address: 1900 Arch St., Philadelphia 3, Pennsylvania.

March 4-5

American Society for Metals, Spring Meeting, Hotel Statler, Boston. Society address: 7301 Euclid Avenue, Cleveland, Ohio.

April 14-16

Society for Experimental Stress Analysis, Spring Meeting, Educational Lecture and Exhibit, Netherland Plaza Hotel, Cincinnati. Harry LaTour, 134 Kensington St., Middletown, Ohio, Spring Meeting Chairman.

April 26-30

American Society of Tool Engineers Annual Meeting and Industrial Exposition, Philadelphia.

May 4-7

National Spring Meeting of the American Welding Society, Hotel Statler, Buffalo, New York.

May 5-7

American Society of Training Directors, 10th Annual Conference, Schroeder Hotel, Milwaukee.

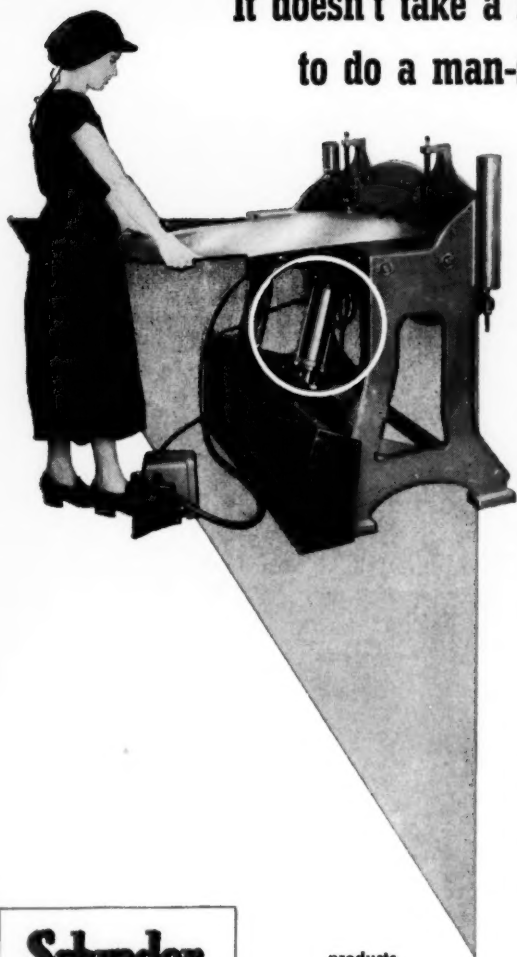
May 5-8

Welding and Allied Industry Exposition, Buffalo Memorial Auditorium, Buffalo, New York.

May 8-14

Biennial Foundry Exhibit, sponsored by the American Foundrymen's Society, Cleveland Public Auditorium.

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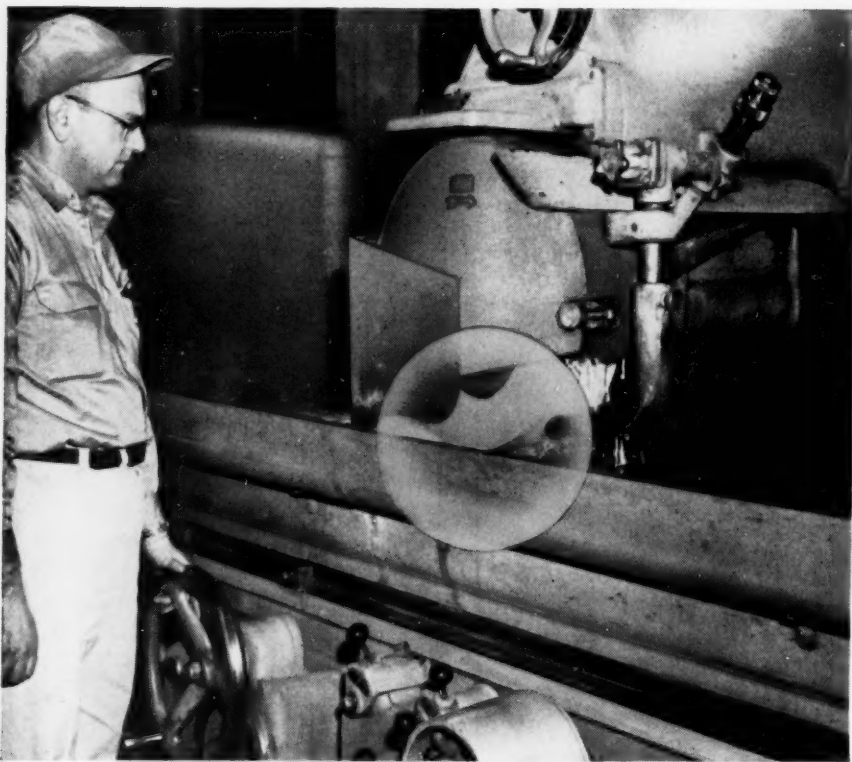
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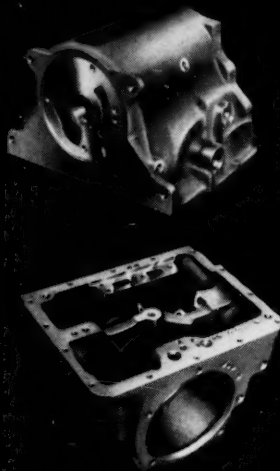


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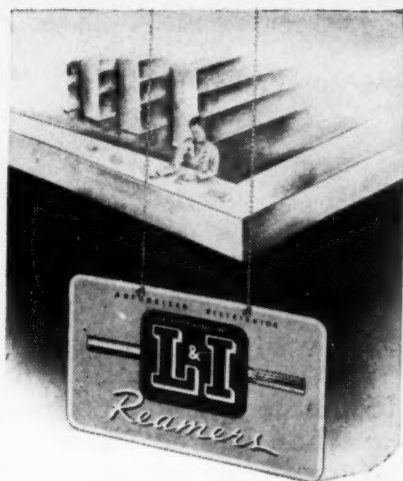
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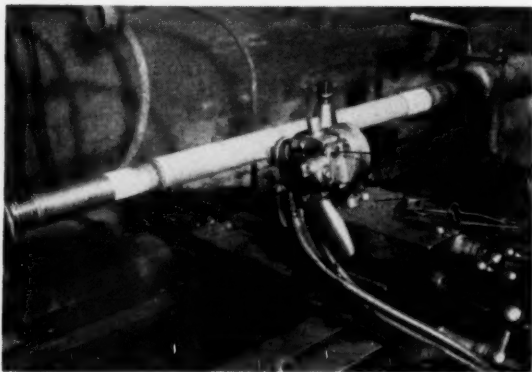
Metallizing Increases Pump Rod Life 30 Times

A large eastern oil company had considerable trouble with pump rods in a 16 x 7 x 14-inch steam pump used for pumping crude oil "bottoms," the non-volatile matter remaining after vaporization of crude oil. Operating conditions for the rods are unusually severe, the "bottoms" containing grit, sand, dirt, and other foreign matter. The pump was first put in service some two years ago and the original cold-drawn steel rod lasted just 48 hours. It was replaced by a hardened steel rod which did little better. Then the company tried metallized stainless and found that the metallized rods would last for four weeks

in 24-hour-a-day service. They also found the shaft could be remetallized three times before it had to be scrapped because of limitations of the packing ring adjustment due to reduced shaft dimension. That meant a total life of twelve weeks per metallized shaft, against 48 hours per original shaft.

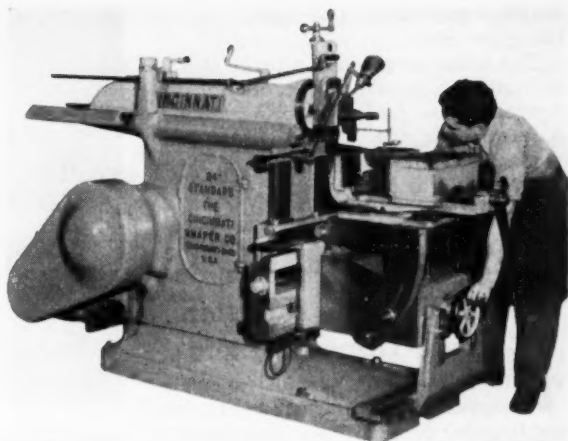
But even that spectacular performance does not mark the limit of the profitable applications of metallizing to this maintenance headache. After using the foregoing method with their own metallizing equipment for two years, the company called in the local machine shop which does considerable contract metallizing and is frequently asked by this company to handle special jobs too large to be ground or

machined on the equipment in their own shops. The contract shop metallized one rod with a sprayed hard-surface coating and the other with a molybdenum coating; both were placed in service on the duplex pump at the same time.



Metallizing pump bearing surface at large eastern oil company

Operator is shown setting up a 24-inch Standard Cincinnati Shaper equipped with a special tilting table for use in machining metal glass molds.



Over nine weeks later both rods were still in service 24 hours a day. The hard surfaced rod showed some wear, but the molybdenum coated rod was still in excellent condition.

Shaper Used in Manufacture of Metal Glass Molds

THE accompanying illustration shows a 24-inch Standard Cincinnati Shaper, equipped with a special

tilting table, that positions work so quickly and accurately that set-up time is held to a minimum. This machine is used in the manufacture of glass molds, and is instrumental in keeping metal removal to a minimum,

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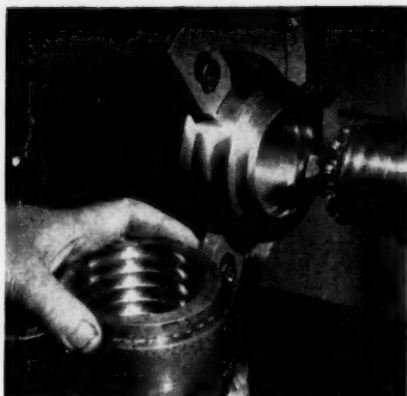
MANUFACTURERS OF PRECISION GAGES

thereby increasing the useful life of the glass mold.

The table tilts about a pivot and is driven by a handcrank arrangement, convenient to the operator's position. A quick clamping scheme is also provided for readily maintaining accurate setups.

Thread Milling Production Increased with Tungsten Carbide-Tipped Cutters

Thread milling of ball raceways in actuating nuts are currently being handled efficiently and economically with tungsten carbide-tipped cutters at the plant of Vard, Inc., Pasadena, Calif., manufacturer of "Ball Screw" actuators and "Hour-Glass" worm gear assemblies. The cutters used in this process are produced in various



Thread milling ball raceways in an actuating nut on a Shields thread mill equipped with Kennametal Grade K4H-tipped cutter

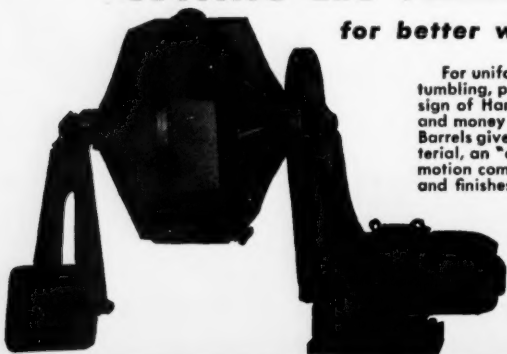
diameters and tooth radii in Vard's own toolroom.

A typical operation is one performed

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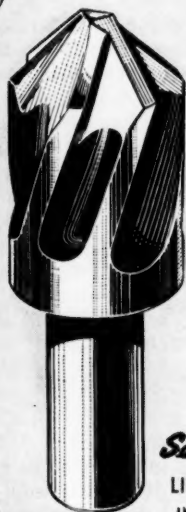
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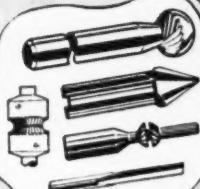
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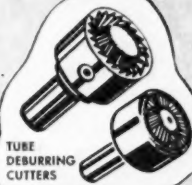
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on an S.A.E. 8620 (70-90,000 p.s.i. tensile strength) steel main-gear actuating ball nut in which the raceway's major diameter is 3.062 inch. Sixteen and three-quarter turns or threads are milled in the raceway at 18 i.p.m. (rotation of workpiece), 0.0045-inch chip load per tooth, 328 r.p.m. rotation of cutter, and 0.100-inch depth of cut. Approximately 0.007 inch of stock is left for finish grinding after heat treat-

ing. The carbide cutter turns clockwise while the workpiece is turned counterclockwise.

Machining is done on a Shields thread mill modified with a 100-lb. fly-wheel on one end of the quill through which coolant is piped directly to the cutter. A combination faceplate and pot chuck is used for holding the workpiece. This equipment was overhauled to minimize backlash and bearing play

and a 5 h.p. motor was installed.

The cutter used for the ball raceway thread milling operation is of 2.500-inch diameter having twelve Kennametal K4H teeth of 0.153 - 0.154 - inch radius, 3-degree negative radial rake, and 0-degree axial rake. The various grades of tungsten carbide first used in this cutter provided for only two or three pieces per grind. Now, tipped with Kennametal, nine pieces are said to be easily machined between grinds. A 5-degree positive axial rake on alternate teeth was tried. Since this design change increased grinding costs without improving finish or cutter life, it was dropped in favor of the 0-degree axial rake.

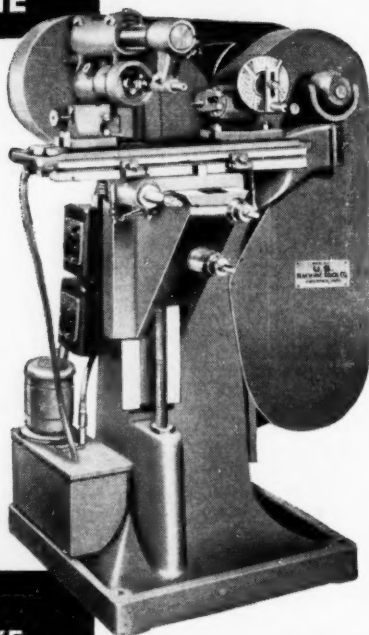
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The fable of



The Three Brothers

**HOLDS A LESSON
FOR CUTTING FLUID USERS**

The Fable

THREE brothers inherited equal shares of their father's farm. One brother feverishly worked his land, with seldom a rest, until prematurely worn out, he died at an early age. The second brother loafed and played until his land went to ruin and he died for want of food. The third brother, wiser than the other two, *balanced* his work and play, so that he prospered mightily and lived to a ripe old age.

The Lesson

BALANCING the *chemical activity* of cutting fluids produces best results, too.

Figure 1 shows abnormal front clearance wear of a single point tool due to *excessive* chemical activity of the cutting fluid used. The tool failed prematurely, just like the first brother in the fable.

Figure 2 shows abnormal cratering of a tool due to *insufficient* chemical activity of the cutting fluid used. Such cratering is usually associated with poor surface finish. This tool failed prematurely like the indolent brother in the fable.

The *proper balance* of chemical activity gives the most profitable results. For the right cutting fluids for your work, ask to have your Stuart Oil Representative call, or write:

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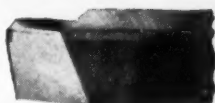


FIG. 1 — Abnormal front clearance wear caused by excessive chemical activity of cutting fluid.



FIG. 2 — Cratering of cutting tool, usually associated with poor finish, resulting from insufficient chemical activity of cutting fluid used.

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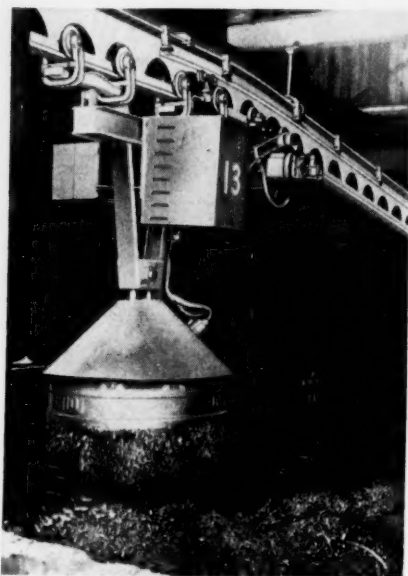
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Magnet-Carrying System Gathers Scrap Automatically

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Cleveland Tramrail automatic scrap-gathering magnet carrier with a load ready to be dumped into the bin. Immediately after dumping, the carrier reverses direction of travel and starts on another trip through the tunnels without attendants.

metal-working machines on the first floor and is emptied through chutes into two parallel tunnels in the ground below. Each tunnel has its own Tramrail track on which a carrier travels back and forth automatically. Scrap from the tunnels is delivered to a bin from where it is conveyed to railroad cars just outside of the building.

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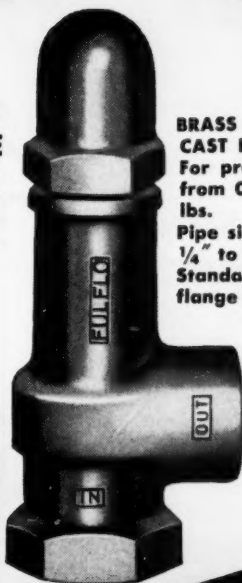
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from the bin, the magnets are in the "off" position and, when going toward the bin, they are "on" and pick up the metal as they move along. When the carriers reach the bin, the power to the magnets cuts off and the loads are dropped. The two carriers operate independently of each other and are equipped with 36-inch diameter magnets. The carriers make a round trip in approximately three minutes. For a distance of 70 feet before they reach the bin, the carriers have to travel up a 13 per cent grade.

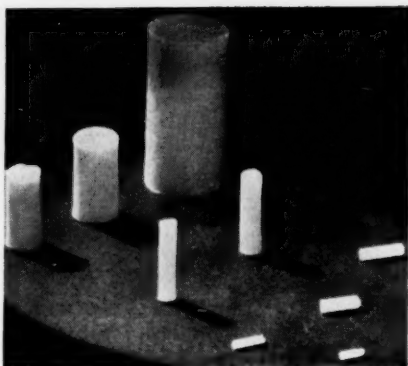


Illustration showing several sizes of wax Tap-Cartridges now being used to keep oil holes chip-free

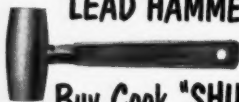
Wax Tap-Cartridges Keep Oil Holes Chip-Free

THE Tap-Cartridge, a product originally introduced by the Tap-Cartridge Co., Cincinnati, Ohio, to eliminate dead chip interference in blind-hole tapping, is now being employed

in large automobile and aircraft engine plants to plug lubricating system holes in such parts as engine blocks, crankshafts, camshafts, connecting rods, and so on, during machining operations. These hard wax cylindrical inserts, when properly placed into oil holes, are said to prevent any possible chance of small chips entering and becoming permanently lodged in these critical areas.

After machining, the cartridges merely melt and disappear when the parts are hot dipped, thus leaving a clean chip-free hole. The cartridges are available in tap sizes from No. 0-80 up to 1 inch and for virtually any depth hole.

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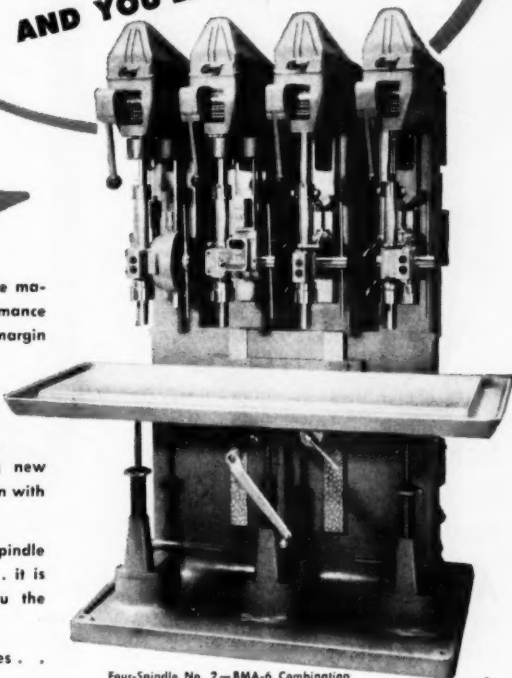
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Assembly Clearance in Dovetail Slots Determined by Air Gaging

AN interesting application of air gaging has been developed by The Sheffield Corp., Dayton 1, Ohio, for determining the amount of assembly clearance in the dovetail slots of a jet engine compressor vane support. It



Equipment used to determine amount of assembly clearance in dovetail slots of a jet engine compressor vane support

consists of a column type "Precision-aire" and a gaging spindle designed to simulate the dovetail root form that fits into the slot in the compressor vane.

The spindle contains a single Ball-jet and a pressure pad arrangement. As it is inserted into the dovetail slot, the pressure pads force the spindle against the angle faces and the Ball-jet registers along the bottom, determining the rate of air escapement. The amount of assembly clearance in the dovetail slot is indicated by the position of the float in the glass col-

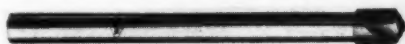
umn; and, as the gage has an amplification of 2,000 to 1, a variation of as little as one ten-thousandth of an inch is amplified to one-quarter of an inch on the Precisionaire scale.

Carbide Die Drill Aids in Lodged Tap Removal

A WHITMAN & BARNES carbide die drill was recently put to an unusual test by the Victor Equipment Co., San Francisco, Calif. While tapping a stainless steel regulator body with a high speed precision ground tap, the tap became lodged in the part and could not be removed by any means at the company's disposal. The flutes were clogged with chips.

Fortunately, the hole in which the tap was lodged was a through hole, and it was suggested that a Whitman & Barnes die drill $\frac{3}{8}$ inch in diameter be used to drill into the tap to a depth of $\frac{1}{2}$ inch. Following this operation, the flutes of the tap were easily broken off and the tap removed. The drill was operated dry and an excessive surface feet per minute

speed was used so that the drill became nearly white hot; yet, the braze

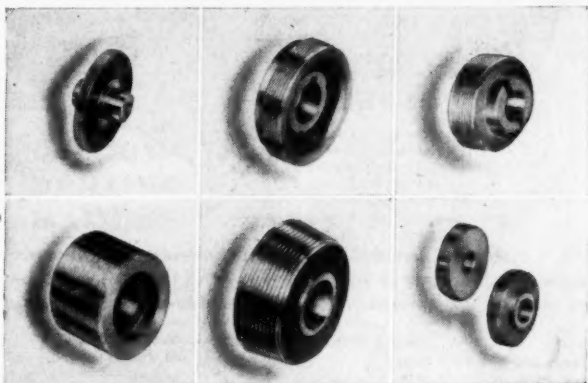


Type of drill used in removing lodged tap from part at Victor Equipment Company

did not fail. The part was valued at \$125.00 and would have otherwise been scrapped.

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economically

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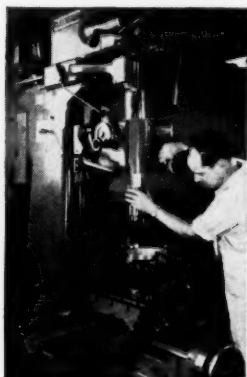
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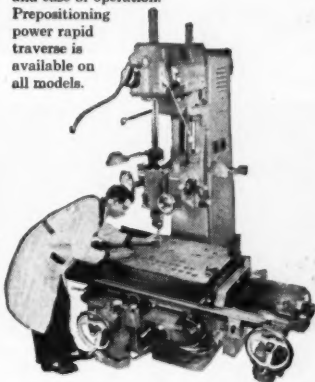


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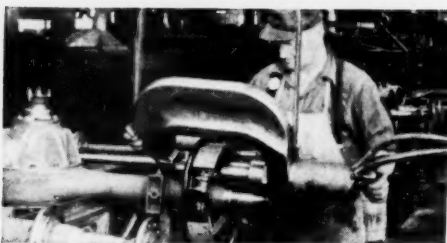
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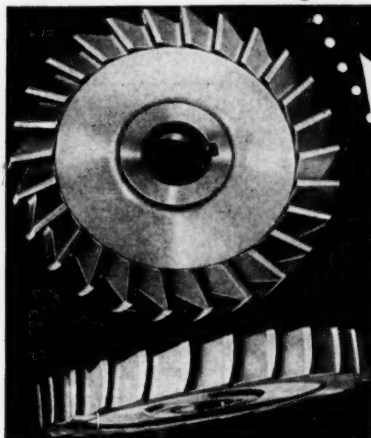
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Designed and developed specifically for production men who look to **NEW** tool designs to reduce top-heavy metal cutting costs, Aber "Curved Tooth" milling cutters operate at speeds 10% to 25% faster than standard straight tooth milling cutters in addition to providing smoother finishes and



close to tolerance operations. Utilizing the most outstanding tooth design developed in the past decade, Aber Engineering Company produces a complete line of quality milling cutters featuring the "Curved Tooth" principle.



A TYPICAL ABER "CURVED TOOTH" PERFORMANCE

OPERATION: Milling lugs on plate. Slotting and side milling parallel sides.

MACHINE: Cincinnati 3 Spindle Mill.

TOOL SETUP: (1) R. H. and L. H. Shear Side Milling Cutter.
(1) R. H. Half Side Milling Cutter.
(1) L. H. Half Side Milling Cutter.

Feed 10-12"

PERFORMANCE: 16-12 hours between grinds. Best previous practice with conventional, straight tooth H. S. S. milling cutters was 6-12 hours between grinds.

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ideas from readers

Parting-Tool Holder

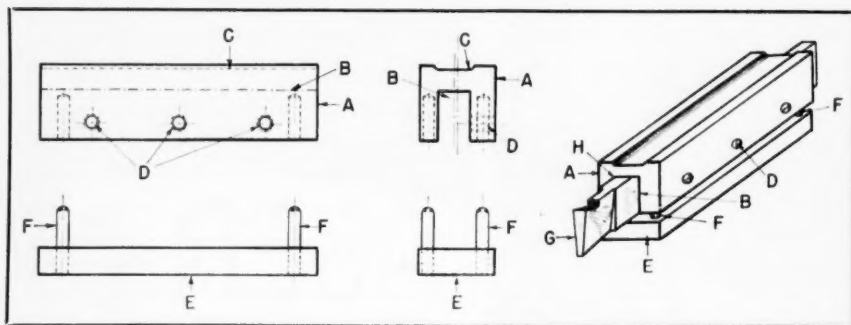
By W. M. HALLIDAY
England

IN THIS article, the writer describes a simple yet effective two-piece holder which is specially designed to provide maximum side and underneath support to the thin shanks of parting tools when used in connection with turret or center-type lathes. Referring to the accompanying sketch, it will be noted that the holder is constructed to accommodate standard parting-off tool sections of considerable length in high speed steel or Stellite. A variety of section shapes and sizes can be held with a minimum of adaptation, the holder being specially designed to af-

ford proper retention of very thin section tool shanks. Moreover, shanks of considerable length may be held in the holder without shortening.

The holder consists of a rectangular case-hardened steel block, **A**, which is ground on all sides so that each side is square with the other sides and absolutely flat. A deep slot, **B**, is machined centrally along the underside of the block, as shown, the sides of the slot being parallel to the outside edges of the block. The slot width is **slightly larger** than the thickness of the largest tool shank to be held, and the depth of the slot is **slightly less** than the width of the smallest size tool shank to be admitted.

A shallow groove, **C**, is machined



Sketch of simple parting-tool holder for turret and center-type lathes

centrally along the top side of the block **A**, the groove extending the full length of the block, as shown. The width of the groove **C** is somewhat wider than the slot **B**; the locking screws in the tool post of the lathe bear upon the base of this groove. The right-hand side wall of the block **A** has three tapped holes for accommodating headless locking screws, **D**, of the Allen type, the ends of which pass into the slot **B**. The block **A** is mounted on a hardened and ground steel base plate, **E**, which is the same overall length and width as the block **A**. The plate **E** is ground top and bottom for accurate flatness and parallelism. Four sturdy hardened dowels, **F**, are inserted in the base plate **E**, one in each corner as shown. The underside of the block **A** is provided with four corresponding drilled and reamed holes to assure a close fit with the dowels **F** when the members **A** and **E** are engaged.

The sketch shows a long rectangular shank tool, **G**, mounted in the assembled holder in readiness for cutting. The tool shank is located in the

slot **B** with the cutting end projecting the required amount for clearing the work. The screws **D** are adjusted to bear firmly on the shank so that the tool will be pressed against the side **H** of the slot. The base plate **E** is located in position on the underside of the block **A**, and assembled holder is then placed in the lathe tool post in such a manner that the clamping screws of the tool post bear on the bottom of the groove **C**. As the clamp-

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ing screws are tightened, the two sections of the holder are pressed together, thereby effectively gripping the tool shank. As gripping pressure is applied, the tool is prevented from tilting sideways by the screws D. The holder also effectively supports the tool at the sides and underneath for maximum resistance to cutting pressures. By reason of the separate retention of the tool shank within the

block A, the parting tool and holder may be conveniently removed from the tool post after use without disturbing the tool setting in any way.

Heavy Duty Die Handler

By GILBERT C. CLOSE

THE thousands of drop hammer dies in use at most large aircraft plants constitute a considerable handling

problem. The usual practice is to stack the dies in piles with separators between each die so that fork lifts can be inserted under the particular die needed. The die is then transported to the drop hammer department where it must be removed from the fork lift by a crane and deposited on a roller table. The table is then wheeled up to the drop hammer and the die pushed by hand into place.

The modified fork lift truck shown in the accompanying illustration is designed to simplify considerably drop hammer die handling operations. Each die is cast with a channel as shown. The device on the front of the fork lift truck is machined to fit the cast-



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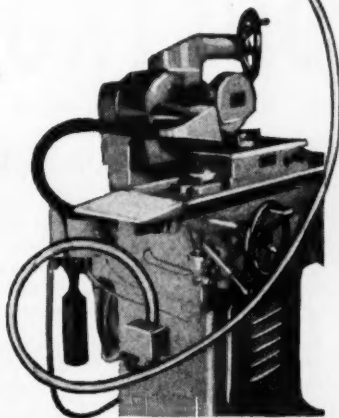
Made by the makers of Vulcanaire The jig grinding attachment.

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With this modified fork lift truck, large drop hammer dies can be easily removed from the die pile and transported to the drop hammer department without the use of any additional materials handling equipment.

ing stability and safety to the die pile.

in channels and is hydraulically adjustable as to width. There is no need to use separators between the stacked dies, thus simplifying storage and add-

adjusts the width of the die lifter, inserts it by moving the truck forward, and then transports the die to the hammer department. Due to the side slots

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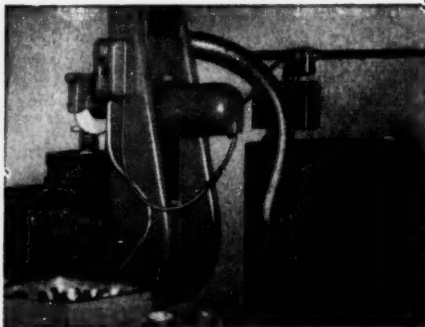
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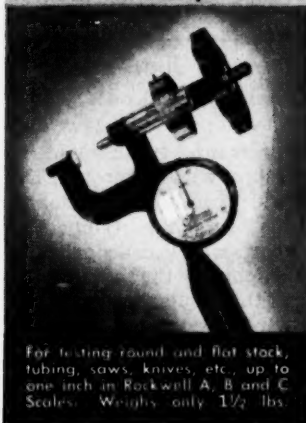


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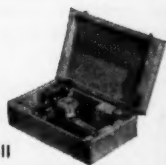


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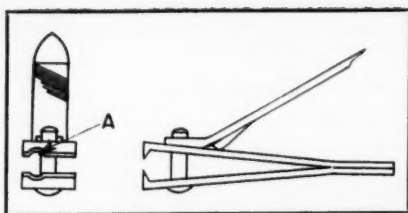
on the die, the handler can place the die directly on the hammer bed and then back the truck away without difficulty. A crane lift and roller table are no longer required.

Nail Clipper Used as Wire Cutter and Stripper

By HAIM MURRO

IN THE accompanying sketch, the writer shows how an ordinary nail clipper can be adapted for use as a combination cutter and stripper for small diameter wire. The small size and compact design permit the tool to be easily carried in the user's pocket.

For cutting wire, the existing knife-like edges of the clipper jaws are used. For the purpose of stripping wire after it has been cut to length, a small hole,



Sketch of ordinary nail clipper adapted for use as combination wire cutter and stripper for small diameter wire

A, is drilled or ground (with a conical mounted grinding wheel) through the jaws at one end with the blades closed. Wire can then be readily stripped by simply inserting a certain length into the open hole, closing the jaws of the clipper to cut the insulation, and then pulling the wire through the hole. The edges of the hole must be sharp in order to properly cut the wire insulation.



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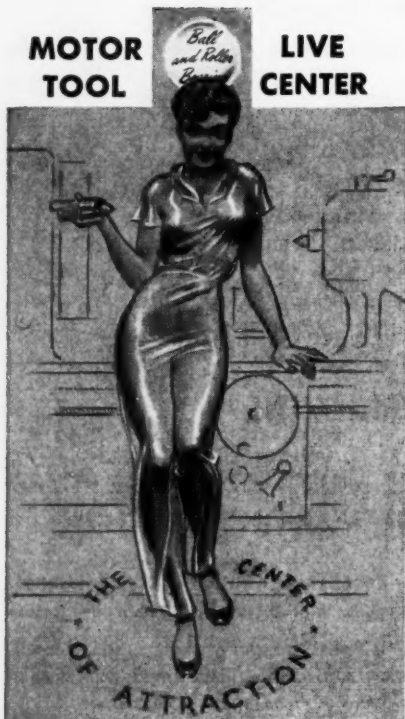
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Smoothing Sheet-Metal Edges

By F. E. RILEY

THE writer has discovered that sharp edges of sheet metal can be quickly and effectively rounded using an ordinary domestic knife sharpener having two sets of hardened wheels whose edges overlap. The particular sharpener illustrated is the type which



Illustration showing method of smoothing sheet-metal edges using an ordinary domestic knife sharpener

is designed for fastening to a table so that the knife can be drawn across the intersection of the two wheel sets for sharpening it. To use this sharpener for smoothing sharp edges of sheet metal, a wooden handle is attached to the sharpener, as shown, and the wheel is then drawn by hand across the edge of the piece of sheet metal which held in a vise, thus removing the sharp corners.

If desired, the sharpener may be held

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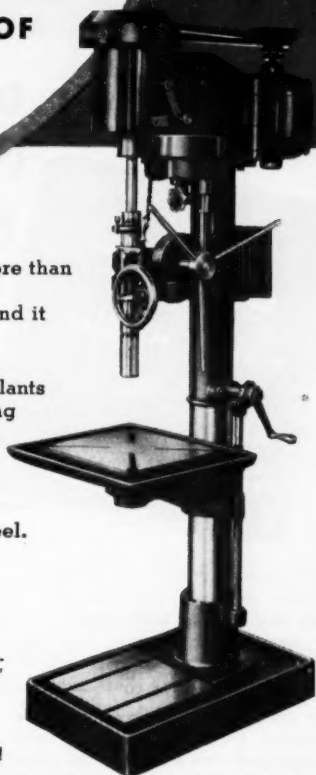
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in a vise and the edge of the metal piece drawn across the wheels. This method is recommended for smoothing the edge of small pieces of sheet metal, including cut-out shapes having curved profiles. Other types of knife sharpeners having handles attached and different wheel arrangements can also be used equally well in deburring sheet metal.

Pipe and Tube Bending. By Paul B. Schubert. Published by The Industrial Press, 148 Lafayette St., New York 13, N. Y. 183 pages. Illustrated. Cloth binding. Price, \$5.00.

This book is essentially a practical working manual which describes and illustrates the common methods of bending ferrous and non-ferrous pipe and tubing and the machines, fixtures,

and devices used. It also provides data and pointers that are useful in both the shop and the field. The descriptive information and data are arranged so that the reader can readily compare the various methods and become familiar with their respective advantages as well as limitations. An entire chapter is devoted to the layout of pipe for bends, giving the formulas employed for various degrees of bend, and helpful information and data concerning minimum radii of bends. Information on topics such as filler materials, mandrels, wooden dies, hot bending, and pipe and tube coiling and bending operations is also provided. Fifteen tables are included in the book.

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Cutting oils smoke because they're heated to the burning point at the tool edge. That's bad for production but, worse yet, it points to a fire hazard. Oil vapors and oils in storage, oil soaked clothing and floors may all contribute to the rapid spread of flames.

No fire hazard exists with all-chemical Lusol metal working solution in your machines. It can't burn, since it contains no oil. Workers' clothing and workroom floors stay cleaner. It doesn't smoke, no matter how hard you work it, so the air is clear in shops employing Lusol.

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Because Lusol contains no petroleum oil, it carries heat away from cutting tools faster. Machines can be run at higher speeds . . . tools last longer and you hold fine finishes and dimensions, since you're not burning cutting edges. Good shopkeeping is easier, with its resulting higher safety and better employee morale.

These are facts proved in hundreds of shops. The booklet, ***Lusol Gets to the Point***, gives you proof. Write for a copy or for help in testing Lusol in your own shop. F. E. Anderson Oil Company, Inc., Box 216-J, Portland, Connecticut.



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SOLUTION**

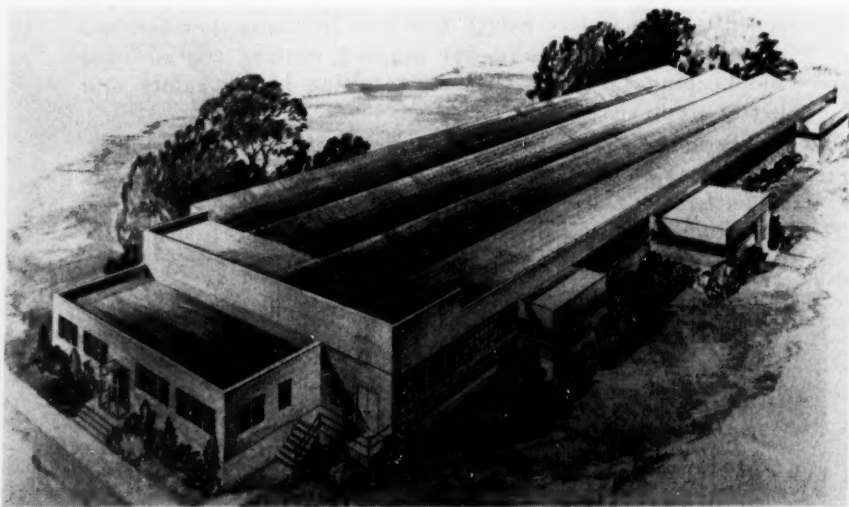
news of the industry

Landis Machine Constructs New Tap Plant

Landis Machine Co., Waynesboro, Pa., has recently completed construction of a new plant to be devoted to the production of its large line of collapsible and solid adjustable taps. The new building is located along the north edge of the company property and is of brick, steel, transite, and glass block non-combustible construction.

The new facilities, which increase both the manufacturing and office areas now devoted to tap production by more than 60 per cent, provide increased productive capacity and the most modern working conditions. Advantage has been taken of the latest developments in plant layout and design, and a considerable amount of new production equipment has been installed by the company.

Wash drawing of new tap plant of Landis Machine Co., Waynesboro, Pennsylvania



Second Welding and Allied Industry Exposition

The American Welding Society will stage its second Welding and Allied Industry Exposition at the Memorial Auditorium, Buffalo, New York, May 5 through the 7th. The society's National Spring Technical Meeting will be held at the Hotel Statler, in the same city, May 4 through the 7th. The society's first show, held in Houston, Texas, last year, attracted key executives from more than 20 industrial fields. The Buffalo exhibit will be almost twice as large, and the attendance is expected to be more than three times as great. More than 100 exhibitors are expected, and the products of more than 300 companies will be shown.

Every type of welding equipment and most accessories will be on display. Exhibits will include equipment for manufacturing and structural purposes, as well as for maintenance needs. Considerable emphasis will be placed on welding techniques for the newer metals. Many automatic

welding processes will also be featured. In addition to the exhibits and technical sessions, visitors will also be taken on tour of major industrial plants in the area. The papers to be read at the meeting will cover every phase of welding, welding engineering, welding procedure, welding metallurgy, and weldable metals.

LET'S TALK FACTS ABOUT FACE MILLS!

"This NELCO solid-brazed, carbide tipped mill is the best tool we've got. We get the most for our money — it's solid, rugged and dependable . . . gives better finishes, higher table feeds and turns out more work between grinds. Boy! It's a Honey!"

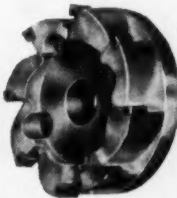
HERE'S WHY . . . 2 or 3 solid-brazed face mills cost less than 1 inserted blade type! The same initial investment provides 1 or 2 spare cutters which can be used for production while grinding the original.

There's less chance of damaging rugged, one-piece solid-brazed type cutters. No moving parts to keep aligned! . . . No loose parts to shatter, to injure workers when accidents occur.

A SOLID tool has to work to closer tolerances! It's fact.

THESE ARE FACTS!...

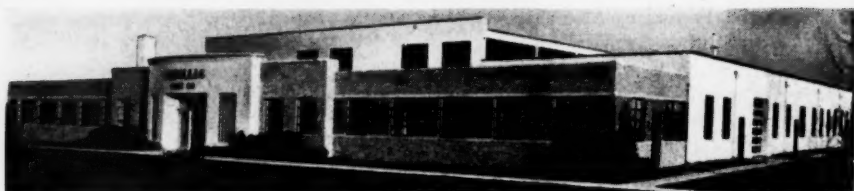
Solid-brazed cutters can be repaired quickly when damaged — No costly machined body to be re-worked or replaced. 1 blade for an inserted type cutter costs as much as 3 to 5 replaceable solid carbide cutter tips. The solid-type face mill has up to twice as much usable carbide. THEREFORE — SOLID-BRAZED FACE MILLS GIVE YOU — MUCH LOWER INITIAL COST — LOWER MAINTENANCE COST — FASTER PRODUCTION — CLOSER TOLERANCES — GREATER SAFETY and LESS DOWN TIME!



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New plant of Cadillac Gage Co., Detroit, Michigan

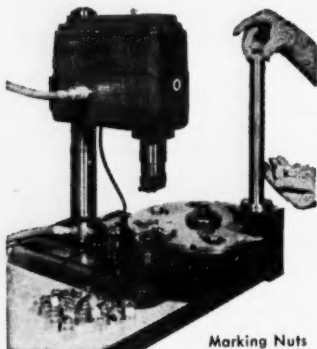
New Plant Doubles Facilities for Cadillac Gage

A new ultra-modern plant, more than double the area of its old plant and providing twice the machining capacity, has been completed by Cadillac Gage Co., Detroit, Mich. Located at 25760 Groesbeck Highway, the new plant is scientifically designed, and the machines and equipment are efficiently arranged. The building is completely fireproof and has brightly painted interiors. Working areas are

roomy and uncrowded. According to Clarence Bauer, director of sales and engineering, it was necessary to build the new plant because of the need for increased capacity to meet the increasing demands for the Cadillac line of precision plug and ring gages, Planchek gages, and hydraulic Servo controls. Another feature of the new plant is the inspection department which is equipped with completely automatic temperature control rooms for inspection purposes.

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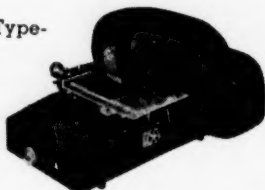
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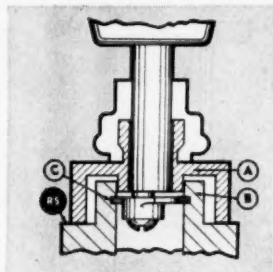
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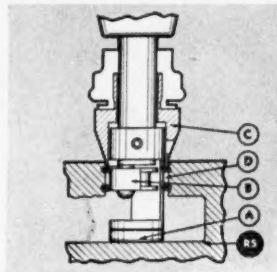
4458 N. WESTERN AVE. *Chicago* 25, ILL. • CORNELIA 7-5882

Waldes Truarc Grooving Tool Out-Performs Conventional Recessing Tools

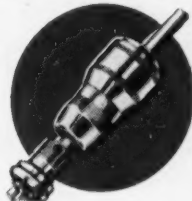
SAVES TIME! CUTS COSTS! NEEDS NO SKILLED LABOR!



Clearing Obstructions or Protrusions - Waldes Truarc Grooving Tool with special bushing with high shoulder A in order to clear obstruction B on reference surface RS so groove can be properly located in bore.

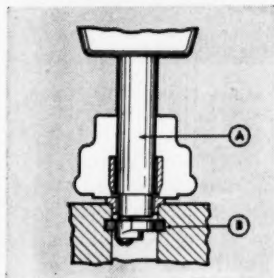


Locating Grooves from Bottom of Hole or Blind Hole - Use of bottom adaptor A and double cutter B. Bushing C pilots tool into bore D while bottom adaptor acts as stop to locate grooves from reference surfaces RS below bore.

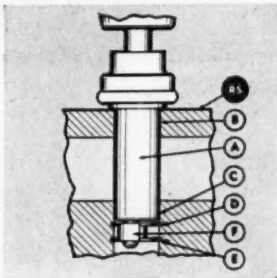


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The Waldes Truarc Grooving Tool adapts quickly and simply to your toughest recessing requirements. With it, even *unskilled labor* can perform high precision, mass production operations.



Small Diameter Bore - Need for Wide Groove - Great versatility of tools allows A-2 Tool to accept stepped down spindle and cuttershaft assembly A. Provides cutting capacity in a bore normally within the range of smaller A-1 Tool. Illustrated, larger tool capacity necessary to cut groove diameter B exceeding normal capacity of standard A-1 Tool.



Extending Reach of Tool - Waldes Truarc Grooving Tool assembled with extended bushing A increases normal range of tool in order to reach proper groove location in bore. Bushing also registers on reference surface RS of workpiece while piloting tool at two points B and C inside bore. Two grooves D and E are cut simultaneously with double cutter F.

WIDE CUTTING RANGE!

The Waldes Truarc Grooving Tool comes in five models: A-1, A-2, A-3, B and C. This wide variety of models enables you to cut accurate grooves in housings with diameters from .250 to 5.000 inches. Special features, modifications and adaptations allow each model to operate efficiently under many varying conditions.

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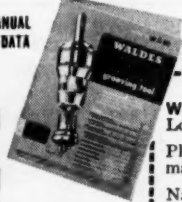
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Waldes Kohinoor, Inc., 47-16 Austel Place
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Title

Company

Business Address

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Illustration showing the inaugural dinner meeting of the Quarter Century Club of The Bullard Co., Bridgeport, Conn., honoring 219 Bullard employees with 25 or more years of service

Bullard Company Organizes Quarter Century Club

A dinner meeting held recently at the Stratford Hotel inaugurated the Quarter Century Club of The Bullard Co., Bridgeport, Conn. The 219 charter members of the club, all of whom have been with the company for 25 years or more, were presented with gold Hamilton watches in recognition of their 6,856 years of combined serv-

ice with the company. Wentworth Mulholland, a retired Bullard employee with 42 years of service with the company, served as the general chairman of the organization committee.

Among the members of the club are two men, Charles Mayer and Foster P. Whitworth, with 50 years of service to their credit. In addition, there are 20 members in the 40 to 49-year group, 92 in the 30 to 39-year

NEW! REVOLUTIONARY!

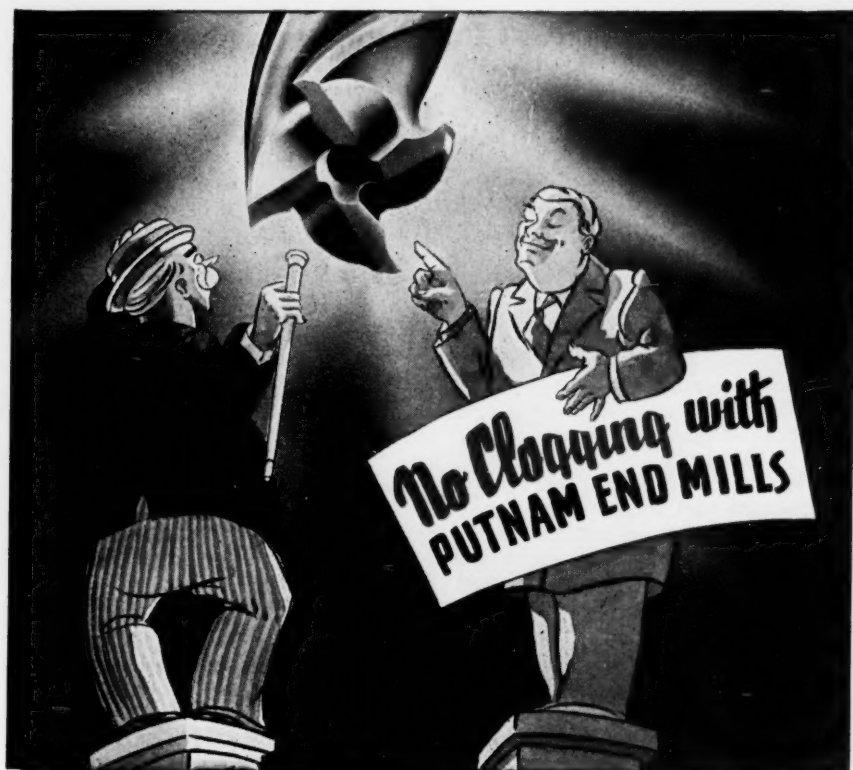
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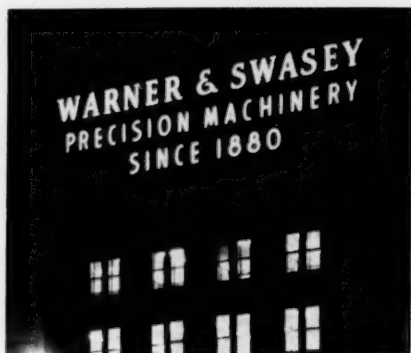
2981 CHARLEVOIX AVENUE • DETROIT 7, MICHIGAN

group, and 105 in the 25 to 29-year group.

After presentation of the watch awards by E. C. Bullard, president of the company, the following club officers were named; Edward C. Bullard, president; Ralph A. Shoemaker, vice president; Frederick H. Somers, secretary; and Thomas P. O'Hara, treasurer.

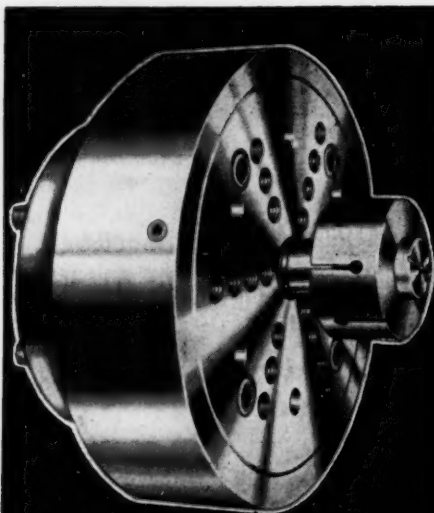
Changing Times Reflected in Sign

The Warner & Swasey Co., Cleveland, Ohio, recently replaced its old sign, "Turret Lathes," with a new sign which reads "Warner & Swasey—Precision Machinery Since 1880." For some 70 years the company was known as a machine tool builder, with turret lathes being its major product. However, after World War II there was a change. Warner & Swasey diversified its products and now manufactures a



New sign erected on building of Warner & Swasey Co., Cleveland, Ohio.

wide variety of precision machinery, including machine tools, pin drafters, converters, weaving machines, and others. The new sign was erected in recognition of the diversified products produced by the company.



9 Reasons for You to get the Facts on SPEEDGRIP CHUCKS

1. They increase production.
2. They give greater accuracy.
3. Set-up time is shorter.
4. They are safer to operate.
5. First cost is low.
6. Maintenance cost is low.
7. Design is simple.
8. Guaranteed to do the job.
9. Service is prompt.

Speedgrip Precision Internal Chucks will save you money on second operation work.

WRITE FOR FREE MANUAL



SPEEDGRIP CHUCK

820 N. WARD STREET
ELKHART, INDIANA

Pick the Top "NAME BAND"

for all these
Metal-Sawing
Jobs



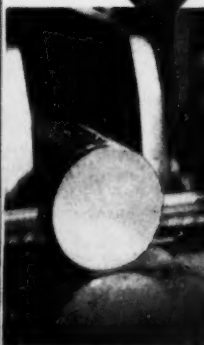
For Heavy Production Cutting

You'll like this rugged, break-resistant standard tooth blade for trimming gates and risers off castings, cutting metal bars and other tough production work. Hardened along the tooth edge only, it cuts fast, stays sharp, gives a longer run for your money! All standard widths and tooth spacings. Furnished in 100' and 300' coils or welded to specific machines.



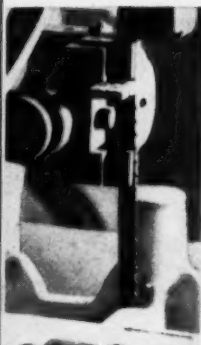
For Contour Cutting and Die Making

In the narrower widths, this edge-holding, smooth cutting blade is an outstanding favorite for contour work. Because the teeth are set with absolute evenness on both sides of the blade, you can depend on straight, on-the-line cuts with no "leading." All standard widths and tooth spacings furnished in 100' and 300' coils or welded to specified length.



For Horizontal Cut-Off Work

Furnished either Regular or Wavy Set in the wider widths, this Simonds-made standard tooth blade easily handles the wide variety of cutting required in general shop and steel warehouse operation. All sizes come in 100' and 300' coils or welded to length.



For Cutting Soft Materials

This Skip-Tooth Hard Edge Blade has extra gullet capacity with maximum blade strength . . . gives fast, trouble-free service in cutting aluminum, magnesium, plastics, plywood and hardwood. All standard sizes available in 100' and 300' coils or welded to length for specific machines.

Get Delivery From Stock From Your Industrial Supply Distributor

Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon.
Canadian Factory in Montreal, Que. • Simonds Divisions: Simonds Steel Mill, Lockport, N. Y.
Simonds Abrasive Co., Philadelphia, Pa. and Ardena, Que., Canada





Newly leased Bliss plant in San Jose, California

Bliss Leases West Coast Plant

E. W. Bliss Co., Canton, Ohio, has signed a 10-year lease with Industrial Assets Company for a manufacturing plant located at San Jose, California. The 62,500 square-foot factory is presently equipped to manufacture and repair all Bliss products except the largest metal-working presses and rolling mills. The plans for the San Jose plant include the manufacture of the firm's general line of machinery. A complete

stock of standard parts for Bliss-built presses will be maintained, as well as standard die sets and supplies manufactured by the company's subsidiary, The Die Supply Company of Cleveland. Special diemakers supplies will be manufactured on the premises. The newly leased plant, it is claimed, will enable Bliss to improve its service to the western metal-working industry, both in supplying new equipment and maintaining machinery now in use.



Notch

12 PIPE ENDS per MINUTE

Make Perfect Joints for Welding or Brazing

ARCFIT

REG. U.S. PAT. OFF.

NOTCHES CLEAN NO FINISHING



Standard ARCFIT in hand or power press shears contours for "T" joints for 1/2" to 2" pipe or tubing with easily interchanged dies. Special ARCFITS for larger sizes, angles other than 90°, slotting or notching square pipes, angle iron or flat stock.

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TOOL & DIE CORPORATION

1823 N. 32nd AVE. • MELROSE PARK, ILL.

Send for descriptive literature

Standard Arc-Fit works well in our special HAND PRESS



POSITIVE DRIVE...QUICK CHANGE



with Continental Counterbores...

You can reduce your tool cost, improve accuracy, and increase production with the Continental complete line of standard drive interchangeable cutting tools. Cutters have a balanced, indestructible drive—originated by Continental—that will not stick, will not break, and is hand detachable after toughest cuts.

Order through your local Ex-Cell-O representative or write to Continental in Detroit.



CONTINENTAL TOOL WORKS

Division of Ex-Cell-O Corporation
DETROIT 32, MICHIGAN



Lodge & Shipley Acquires Columbia Machinery & Engineering Corporation

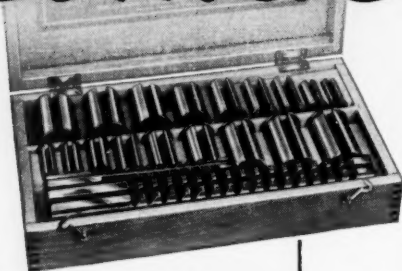
The Lodge & Shipley Co., Cincinnati, Ohio, has acquired, through merger, The Columbia Machinery & Engineering Corporation in Hamilton, Ohio. The merger was announced jointly by William L. Dolle, president of Lodge & Shipley, and James A. Walsh, chairman of the board of Col-

umbia Machinery, following approval of the merger by the shareholders of both companies. Under the merger agreement, the directors who will serve on the board of directors of The Lodge & Shipley Company are Joseph V. Delaney, Mr. Dolle, George E. Fee, Walter F. Grote, Thomas T. Kling, Lawrence H. Kyte, Allen W. Merrell, Ralph W. Miller, J. Herbert Myers, James B. O'Donnell, John R. Queen,

Alfred Schwarzenbach, Mr. Walsh, and Louis B. Weber.

Operations will be continued at both Cincinnati and Hamilton without interruption, and no change will be made in management or personnel. The Hamilton plant will be changed in name to Columbia Division of The Lodge & Shipley Company. The principal products of Lodge & Shipley are metal-working lathes and specialized metal-turning equipment. Columbia Machinery manufactures power squaring shears, power press brakes, and metal-forming presses for the metal-working industry and hydraulic presses for wood-working, plastic, and fiber industries.

KEYWAYS?



CUT 'EM EASY—by hand, arbor press

CUT 'EM QUICK — one minute per keyway

CUT 'EM CHEAP — as little as a penny apiece

(25 standard Kits; 23 standard sizes of broaches; 71 standard size bushings; and a wide variety of production type, guideless broaches)

with du MONT *Minute Man* KEYWAY BROACH KITS

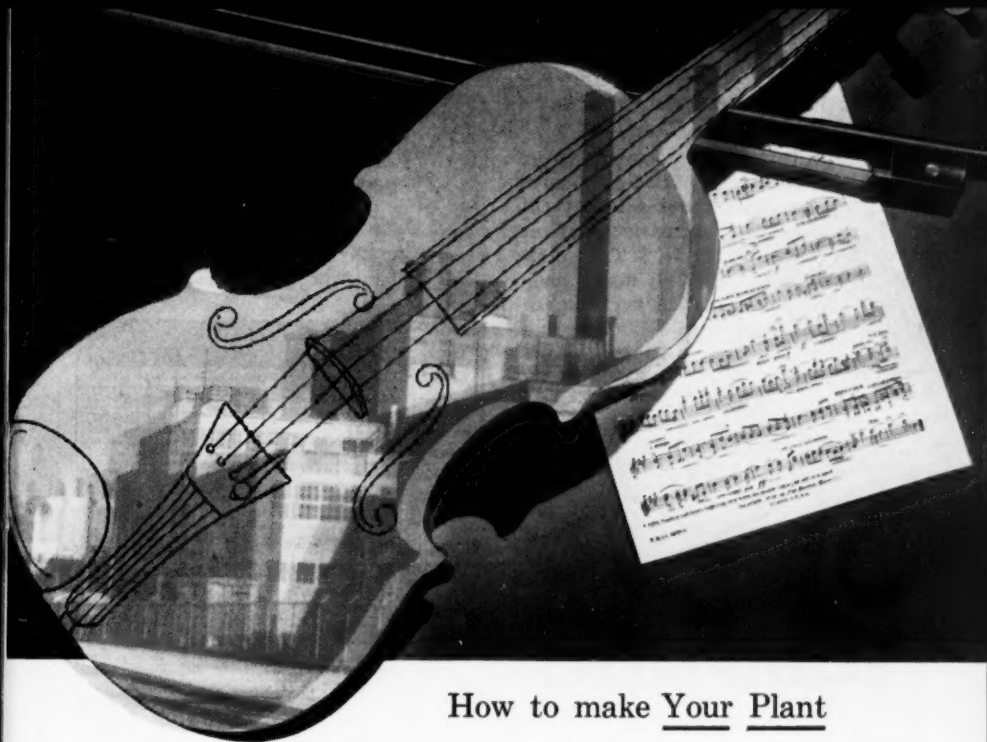
CUT AND MAIL THIS COUPON TO

The du MONT CORPORATION, Greenfield, Mass.
MAIL ME FREE CATALOG and PRICE LIST S

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How to make Your Plant fit as a fiddle!

SWITCH TO CIMCOOL[®], and listen to the sweet music of your machines as they run faster, smoother than ever. Then listen to the happy melody of your adding machines totaling the money saved. For this revolutionary cutting fluid—this *chemical emulsion*—lowers costs three important ways:

CIMCOOL INCREASES TOOL LIFE (and thus reduces down time) because of its *chemical lubricity*.

FASTER SPEEDS are possible because Cimcool *cools faster*, through a unique physical change in the cutting fluid itself. Tools and chips actually stay cool to the touch.

CIMCOOL COSTS LESS than old-fashioned cutting fluids because it *lasts longer*. It also cuts labor costs for cleaning and changing.

It virtually eliminates rancidity and foul odors. And, because of its low surface tension and low adhesion to work and chips, there is practically no carry off.

For a demonstration of how to make your machines *sing—for a song*—just write us. We'll have one of our Cincinnati Milling-trained machinists call on you—without cost or obligation. Or, if you prefer, write for our free booklet, "Cimcool Defeats Heat." Address Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

°Trade Mark Reg. U.S. Pat. Off.

CIMCOOL

for 85%
of all metal cutting jobs

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

Wood & Spencer Announces Handy Tap Guide

For facilitating the performance of routine tapping jobs, Wood & Spencer Company has announced a handy tap guide which shows comparisons of tap pitch tolerances with N. S. T. C. class fits. It provides tap drill sizes, basic thread dimensions, data on machinability of various metals, cutting fluid



COLLET EQUIPMENT

Use-Em-Up Type Drill Sleeves
Use-Em-Up Type Drill Sockets
Standard Type Drill Sleeves
Standard Type Drill Sockets
Short Shank Type Sleeves
Short Shank Type Sockets
B. & S. Taper to B. & S. Taper Sleeves
B. & S. Taper to Standard Taper Sleeves
Standard Taper to B. & S. Taper Sleeves
Rough Shank Sockets
Solid Type Sockets
Morse Taper Shank Tap Sockets
Standard Spot Facing Cutter Bars
High Speed Point Lathe Centers
Carbon Steel Lathe Centers
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Blank End Arbors
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Drill Drifts
Magic Type Chucks and Collets

Standard tools for all drilling, reaming, and tapping needs and special tools to order. Immediate attention to regular or special requirements.

THE COLLIS COMPANY
CLINTON, IOWA

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woody spencer's
Handy **TAP GUIDE**



The Wood & Spencer Company, Cleveland 3, Ohio

Tap Pitch Tolerances Compared With NISTC and Unified Thread Class Fits 8-40 to 5-16-18	
Tap Pitch Tolerances Compared With NISTC and Unified Thread Class Fits 5-16-24 to 11-12	
TAP DRILL SIZES	WITH BASIC THREAD DIMENSIONS
MACHINABILITY RATINGS OF VARIOUS METALS • CUTTING FLUID RECOMMENDATIONS	
DECIMAL EQUIVALENTS • TABLE OF CUTTING SPEEDS • TAP TERMS • CAUSES OF TAP TROUBLES	

Wood & Spencer Handy Tap Guide

recommendations, recommended cutting speeds, decimal equivalents, tap terms, and information on causes and common tap troubles, all arranged for quick, easy reference.

Designed for hanging on the wall of a tool crib or shop or to lie flat on a desk or engineer's drawing board, the tap guide is available by writing to the Wood & Spencer Co., 1932 E. 61st St., Cleveland 3, Ohio.

Ace Abrasive Laboratories Moves into New Building

Ace Abrasive Laboratories, manufacturer of a complete range of diamond wheels and diamond tools, as

CAMS

MADE TO YOUR SPECIFICATIONS

LET US HANDLE
YOUR CAM PROBLEMS

BLOOMFIELD TOOL CORPORATION
37 Farrand St. Bloomfield, N. J.

The best "soft" hammer your money can buy!



Tough, resilient water buffalo faces deliver plenty of power with full protection for delicate parts and finishes. Faces are easily replaced, and comfortable Safety-Flare handle gives you non-slip grip. Work goes better with a C/R RAWHIDE Jaw-Head. See for yourself.

**CHANGE FACES
IN SECONDS**



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Also C/R Rawhide mallets and Rawhide mauls.
For further information write Dept. 22

CHICAGO *Rawhide* MFG.CO.

1301 Elston Ave.

Chicago 22, Illinois

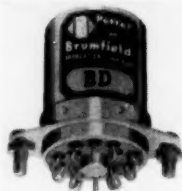
In Canada: Super Oil Seal Mfg. Co., Ltd., Hamilton, Ontario

well as diamond powders and compounds, has combined its operations in its own modern building located at 35 Roselle Street, Mineola, New York. Formerly located in two New York City buildings, the factory and executive offices are both expanded in the new quarters which contain approximately 10,000 square feet of floor space. According to Benjamin Greenfield, president of the firm, the move also provides the opportunity for im-

proved research facilities, as well as faster service to customers.

Potter & Brumfield to Manufacture Borg Solenoid-Type Relay

Potter & Brumfield, Princeton, Ind., has been granted a license under all patents and applications of the W. N. Borg Corp., Hartford, Conn., for the manufacture of a new solenoid design of relay. According to the manufacturer, the relay is a miniaturized version with a dynamically-



New solenoid-type relay to be manufactured by Potter & Brumfield

balanced magnetic structure that will withstand extremely high shock and vibration. When tooling is completed, the relay will be offered with up to 6 form C and for either d. c. voltage or current actuation to withstand ambient temperatures from minus 65 to plus 200 deg. Centigrade.

standardize on standard

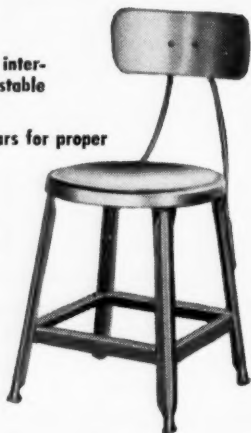
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designed for comfort while working

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- Spring steel back bars for proper posture
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This and other HALLOWELL Posture Stools and Chairs are stocked and sold by leading industrial distributors. Write for literature. STANDARD PRESSED STEEL CO., Jenkintown 22, Pa.

HALLOWELL SHOP EQUIPMENT DIVISION

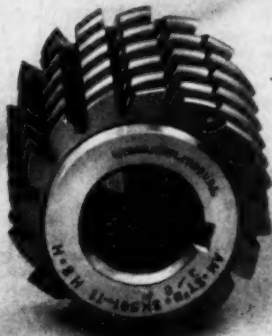
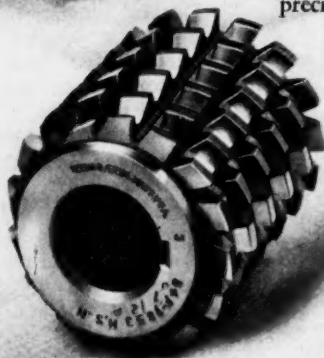
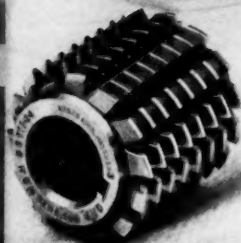
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Precision was built into every detail of this Nineteenth Century clock.

Today, the finest gears are mechanically reproduced by means of precision-built hobs. For the best in hobs — demand precision hobs by Union.



Renaissance 19th Century French Clock,
made in Paris by RAINGO, Circa 1840

- HOBBS**
- Involute Spline
- Parallel Spline
- Worm Gear
- Tangential
- Spur Gear
- Helical Gear
- Ground
- Unground
- Accurate Unground
- Finishing
- Roughing
- Pressure
- Protuberance
- Stub-Tooth
- Standard Gear
- Composite Form
- Combination Pitch
- Topping
- Semi-Topping
- Non-Topping
- Herringbone Gear
- Shank Type
- Shell Type
- Serration
- Square Shaft
- Tapered Hole
- Multiple Thread
- Special Shape
- SPROCKET**
- Silent Chain
- Roller Chain
- Special

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Milling Cutters Gear Cutters Twist Drills Hobs Reamers Carbide Tools

OWNERS AND OPERATORS OF: S. W. CARD MANUFACTURING CO. DIVISION, Mansfield, Mass.
BUTTERFIELD DIVISION, Derby Line, Vermont and Rock Island, Quebec

CUT INVENTORY COSTS, ORDER FROM YOUR LOCAL DISTRIBUTOR

S.E.S.A. Spring Meeting

The Society for Experimental Stress Analysis has announced that its spring meeting, educational lecture, and exhibit will be held April 14, 15, and 16, 1954, at the Netherland Plaza Hotel in Cincinnati, Ohio. Further information regarding the meeting may be obtained by writing to Harry LaTour, Chairman, S. E. S. A. — Spring Meeting, 134 Kensington St., Middletown,

New Sales Setup Announced by Lufkin

E. H. Meibeyer, vice president of The Lufkin Rule Co., Saginaw, Mich., has announced that in order to make its national sales program more effective, the company has established two new regional sales divisions, which, together with the New York and West Coast divisions, effectively divide the country into four sales areas for the country.

William F. Rockwell has been appointed sales manager of the new East Central division. Formerly assistant sales manager, Mr. Rockwell has been associated with Lufkin since 1934. D. F. Oltz has been named sales manager of the new West Central division. Mr. Oltz joined the firm in 1951 and was connected with the sales department at the home office of the company.

In order to coordinate administrative matters better in the sales department, Thomas W. Wise has been made assistant to Mr. Meibeyer and will also work on the planning as well as analyses of sales division operations and objectives.

**FOR LOW COST
AND BIG RESULTS**
Feed Your Presses With
LITTELL
STYLE "M" AUTOMATIC
ROLL FEED



FOR SPEED... With Style "M" automatic feeding your press can easily produce 9,000 stampings an hour at 200 strokes per minute, or 4,600 stampings an hour at 100 strokes per minute.

FOR VERSATILITY... Style "M" feeds left to right, right to left and front to back. Feed direction can be reversed by simply reversing clutch. Feed lengths per stroke are 0 to 4 3/4" with standard gears and 0 to 8 1/2" with compound gears.

FOR ADAPTABILITY... Style "M" is adaptable to any standard punch press. It feeds coil stock up to 8" wide and up to .055" thick (17 gauge).

FOR SAFETY... Style "M" automatic feeding keeps hands and fingers away from danger, prevents costly accidents.

WRITE FOR CATALOG

FOR DURABILITY... Style "M" is built with hardened and ground feeding rolls and the other quality features that have made Littell Roll Feeds accurate and durable since 1918.

FOR ECONOMY... Style "M" brings you a big saving in price. It gives your presses the lowest insurance rate. It cuts your cost per stamping by multiplying press output.



ROLL FEEDS • DIAL FEEDS
STRAIGHTENING MACHINES
REELS • AIR BLAST VALVES

District Offices: Detroit, Cleveland

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Arthur H. Starrett, president of The L. S. Starrett Company, and William J. Greene, vice president and director of sales, congratulate members of the sales staff for their 25 years of service with the company. All received watches on the occasion of the Starrett 25-Year Service Banquet. Group includes, left to right, R. M. Peckham, southern sales manager; W. W. Haskins, western sales manager; W. J. Green, vice president and director of sales; J. E. Hindes, Pittsburgh; H. J. Davidson, Boston; A. H. Starrett, president; W. R. Barlow, Detroit; and C. O. Newton, sales manager. Also given watches or bonds but not present were E. Lauber, Seattle representative; H. A. Bouchelle and R. Jacobson of the Chicago branch office; and A. G. Lenahan of the New York branch office. Retired sales representatives D. Moffat, G. F. Collins, and G. R. Christie also received watches.

200 Starrett Employees Receive 25-Year Service Watches

Two hundred employees of The L. S. Starrett Company received watches or \$100 U. S. Bonds, in recognition of 25 years of service, at a company banquet held recently in Athol, Massachusetts. This group, with 14 employ-

ees each having over 50 years of service and 186 employees with over 25 years of service each, included President Arthur H. Starrett, who has served the company for 50 years, and Vice President and Director of Sales William J. Greene, who has been with the firm 40 years.

ON OILY AND
GREASY FLOORS

STOP

COSTLY SLIPPING
ACCIDENTS

**USE Tamms
FULLER'S EARTH**

Adds greatly to the safety of your shop • Provides safe non-slip footing • Absorbs oil and grease • Lessens fire hazard because, unlike saw dust or wood shavings, it is non-inflammable • Every shop needs this low cost safety aid.
A trial will convince you. Send for FREE SAMPLE.

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TAMMS INDUSTRIES, INC. 228 N. LA SALLE ST. CHICAGO 1, ILL.

**Tough
centerless
production
problem**

**got you
on
the
SPOT**

Here's the
grinding wheel
that will
ABSOLUTELY
solve it!

Are you in a predicament over a tough centerless grinding production problem? CINCINNATI Grinding Wheels can get you off that hot spot because they're made to team-up with centerless grinders.



The Thermador Electrical Manufacturing Co., Los Angeles, had tough problem in grinding 4.2 mortar shells. Chatter and burning caused erratic production. For solution, see Case History.

And with a Cincinnati Milling-trained machinist on the job to help you get the most out of CINCINNATI Grinding Wheels, you can count on the *right answer*—FAST! Here's why:


1 CINCINNATI Grinding Wheels are used by—and developed by—Cincinnati Milling, which has done more research, had more experience and made more centerless grinders than any other organization in the world.

2 Using CINCINNATI Wheels, we've solved hundreds of centerless grinding problems—such as production, roundness, taper, sizing, stock removal, finish and accuracy.

3 CINCINNATI Grinding Wheels represent 25 years of Cincinnati Milling research and practical experience based on an entirely new approach to grinding wheels—the development of the grinding wheel as a true cutting tool.

We are so confident—so *absolutely sure*—that CINCINNATI Grinding Wheels can help solve your tough centerless production problem that we make this *unconditional offer*: either you must be completely satisfied, or we will make no charge for the CINCINNATI Grinding Wheel used.

So contact us at once. We'll send one of our expert machinists—men



How CINCINNATI GRINDING WHEELS Solved Tough Centerless Production Problem

The job	Thru feed grind 4.2 mortar shells. Material - resistance welded steel tubing SAE 1030-1050 normalized to 75,000 p.s.i. Stock removal - .010"-.015". Tolerances - size .003, finish 75 r.m.s.
The machine	Cincinnati No. 2 Centerless
The problem	Erratic production caused by chatter and burning.
The solution	A Cincinnati Milling machinist, in collaboration with the customer, Thermador Electrical Manufacturing Company of Los Angeles, worked out the solution — on the job — using a Cincinnati Wheel from local stock.

The wheel prescribed was a Cincinnati 2450-K5-V8, 20" x 6" x 12". In addition to providing the correct wheel, the Cincinnati expert also recommended changing the type dresser, and adjusted the blade angle, work speed and feed rate.

Results — all troubles were eliminated and production was not only stabilized but increased!

who are Cincinnati Milling-trained and know grinding and grinding machines as well as grinding wheels. He can show you how to get the most out of CINCINNATI Grinding Wheels and help you solve that tough centerless production problem. There is no charge for his service. Write, wire or phone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.


CINCINNATI
Grinding Wheels

THE CINCINNATI MILLING MACHINE CO.

Cincinnati 9, Ohio



Drafting Template Service Offered by Hermes

A special service offering custom-made plastic templates to drafting departments has been announced by Hermes Engravers, Inc., Dept. No. 27, 13-19 University Place, New York 3, N. Y. According to the manufacturer, the templates are capable of reducing the time spent on repeat drawings of parts requiring duplication as much as 75 per cent. The company fabricates plastic templates individually cut in any quantity. All templates are made according to specifications from origin-



Hermes Custom-Made Drafting Template in use

al blueprints and are cut in 0.030 inch plexiglas with a 15-degree bevel for the tracing pencil to ensure utmost accuracy.



WADE ENVELOPES
protect
Shop Orders, Drawings,
Blueprints, Etc.

Two styles. No. 2 with fibre back, No. 3 transparent both sides. Non-inflammable acetate windows. Special style or size to order.

Write for details.

WADE INSTRUMENT COMPANY
Dept. M, R.F.D. No. 1, Chardon, Ohio

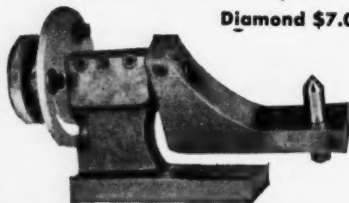
For further information on any product mentioned in this issue—use the READER SERVICE CARDS opposite page 404.

Get a better "SURFACE GRINDER" job at less cost

ORDER DIRECT on our 10 day money back guarantee

RADIUS DRESSER \$39.00

Diamond \$7.00



Hardened shaft—Bearing adjustable for wear
Diamond always perfectly centered.
Easily set adjustable 180° stops.

10" Wheel size for DeALL and NORTON
Grinders—\$44.00. Diamond \$7.00.

SPECIAL 20" Wheel Size \$110.00.

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SPERMAN METAL SPECIALTIES

ANGLE DRESSER \$44.00

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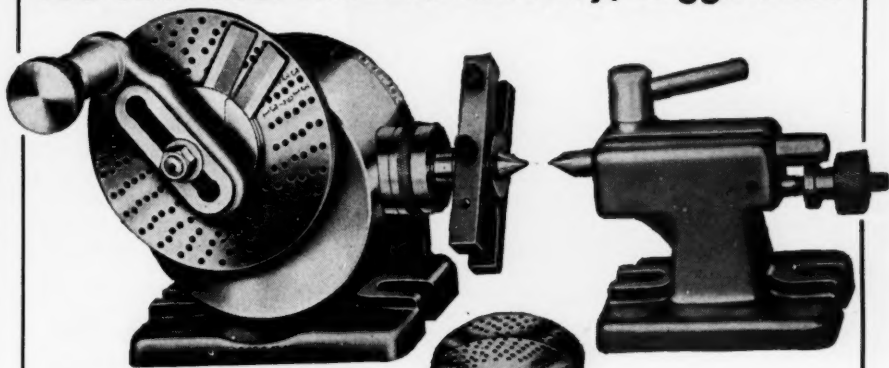
Ball Thrust
Bearing. 24

Precision Ground Surfaces. Can be set
very accurately with a Protractor or Sine
Bar. Works underneath the wheel. Large
bearing surfaces.

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• BROOKLYN 29, N. Y.

You Can't Beat Them for Accuracy, Ruggedness



L-W MODEL SD 36 LB. 6 1/2" Swing DIVIDING HEAD

Ideal for Smaller Milling Machines

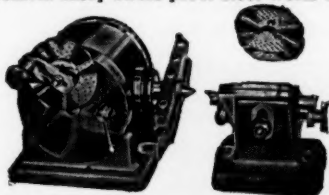
SPINDLE THREADED 1 1/2"-8 TO FIT L-W 5"

Only \$132.00

UNIVERSAL CHUCK

Heavy duty headstock and tailstock designed for maximum rigidity. Alloy steel threaded headstock spindle with extra large tapered bearing and takeup adjustment collar. Head tilts to 90° in vertical position. Alloy stress-proof steel worm and

accurately cut worm wheel cut to close limits for accuracy. Ball bearing thrust and adjustable for end play. Complete with three index plates for dividing all numbers to 50 and even numbers to 100, except 96T. Index chart shows all divisions obtainable to 380. Right or left hand models.



Model BP 11" Swing for plain milling machines.
Shipping weight, 140 lbs....

\$225.00



Model AU 11" Swing.
Fully Universal for complete indexing and spiral cutting.
Shipping weight, 190 lbs.

\$327.50

ALL OUTSTANDING VALUES BY AMERICA'S LARGEST BUILDERS OF DIVIDING HEADS

IMMEDIATE DELIVERY

Order from your industrial supply distributor or order direct, giving name of your distributor.

Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products



L-W CHUCK COMPANY

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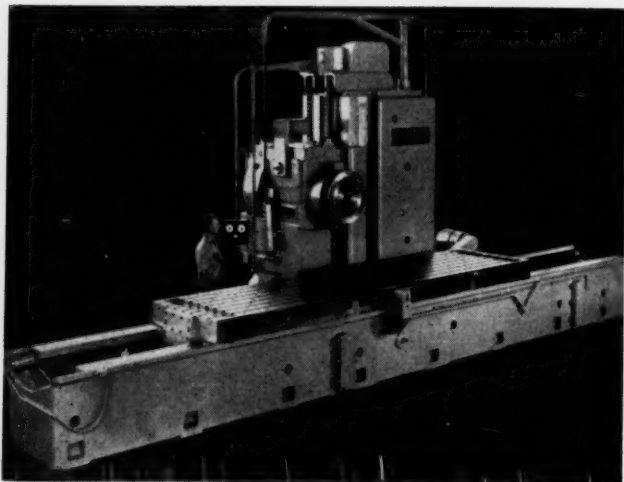
new shop equipment

Machine Is Designed for Heavy Milling Operations

For heavy work, such as milling die blocks from the rough prior to cutting an impression or removing the old impression before recutting on used die blocks, Sundstrand Machine Tool Co., 2539 Eleventh St., Rockford, Ill., has announced the Model 77 Rigidmil which has vertical feed to the head in combination with longitudinal table feed so that an automatic square cycle can be obtained. A scale attached to

the vertical head and an adjustable pointer on the bed are provided for setting up the automatic cycle or manually operating the machine. The basic machine has a 48-inch wide table and can be furnished with feed strokes of 144, 168, 192, or 216 inches. A variable feed drive is provided for both longitudinal movement of the table and vertical movement of the head, with meters in the pendant control unit indicating the rate of feed in inches per minute.

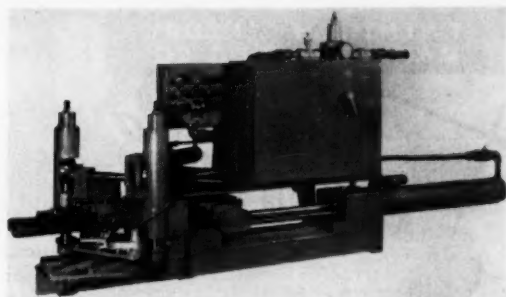
The spindle head is of the horizontal type and can be supplied with either a 60, 75, or 100-h.p. spindle drive motor. A meter on the control panel indicates the per cent of full load current on the spindle motor. Speed changes are ob-



Sundstrand Model 77
Rigidmil

National Air-Powered Horizontal Broaching Fixture

tained by means of pick-off change gears. A variable speed drive for the spindle head can be furnished for the machine as optional equipment if desired.



Fixture Simultaneously Broaches Two Non-Parallel Slots

An airpowered horizontal broaching fixture, built by National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich., is designed to simultaneously broach two non-parallel slots in a die cast aluminum washing machine gear case cover. The $\frac{1}{8} \times \frac{1}{8}$ -inch slots, which are provided in the part to guide control bars, are located at a 10-degree angle to each other. The fixture, it is claimed, produces the slots quickly, only eight seconds being required to load, broach, and unload the part.

Simultaneous broaching of the slots is achieved by a unique broach puller design in which each broach is attached to individual angular mounted shafts on the puller head through universal joint type yokes. The yokes are mounted on their shafts with linear ball bushings that permit free sideways movements of the yokes in relation to each other. The broaches are mounted in broach holders that are guided in slides above the part; thus, as the broaches are pulled through the angular slots, they are guided in the correct angular paths and the yoke members mounted on the puller head can spread apart on the cutting stroke and move toward each other on the return stroke of the broaches.

A 2-inch diameter air cylinder op-

erates the platform raising mechanism, and a 4-inch diameter air cylinder pulls the broaches through the part. The fixture is approximately 7 feet long x 3 feet high x 2 feet wide and weighs about 800 pounds.

Depressed Center Grinding Wheel Features Glass-Fiber Reinforced Resin Bond

The Carborundum Co., Niagara Falls, N. Y., has announced the Carboflex Depressed Center Grinding Wheel which is designed for rough grinding, weld removal, cutting-off, and slotting operations on ferrous and non-ferrous metals, as well as non-metallics.

Said to combine aggressive cutting action effectively with extremely high strength and resistance to cracking, the glass-fiber reinforced resin bond wheel provides for efficient operation with maximum safety. Designed with a knurled back, in addition to the knurled face, the wheel is said to enable the operator to cut with both sides and the periphery of the wheel without any initial dressing. The wheel is available in diameters of 7 and 9 $\frac{1}{8}$ inches and in $\frac{1}{8}$, $\frac{1}{16}$, and $\frac{1}{4}$ -inch thicknesses, containing a $\frac{3}{16}$ -inch arbor. Grading A24-R-BC is recommended for metal applications, and grading C24-R-BC is designed for non-metallics.

**TWENTIETH CENTURY
MANUFACTURING CO.**



**Uneda
LIGHT**

**DIRECTS A BEAM OF WHITE LIGHT
ON YOUR CLOSE PRECISION WORK**

▼ Tool and Die Makers acclaim it for utility, getting into nooks and crevices hard to reach with ordinary light—for lining up punches in dies or working with the scribe in close places. Completely adjustable and portable. Light does not reflect back to your face. Ideal for inspectors seeking burrs, flaws, etc.



**Price complete with
2 size bulbs \$13.75**

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THIS CATALOG
No. 30**

**GARBERDING
STOP
PINS
& FINGER STOPS**

▼ STOP-PINS are complete self contained units that hold securely in stripper plate. All sizes have 1/32" wall permitting insertion close to die or punch. No threads inside STOPS for springs to catch on.



STOP-PINS (5 Sizes)

▼ GARBERDING FINGER STOPS made in uniform width to fit any standard width slots. Just grind ends to fit. Write for Literature.



FINGER STOPS (3 Sizes)

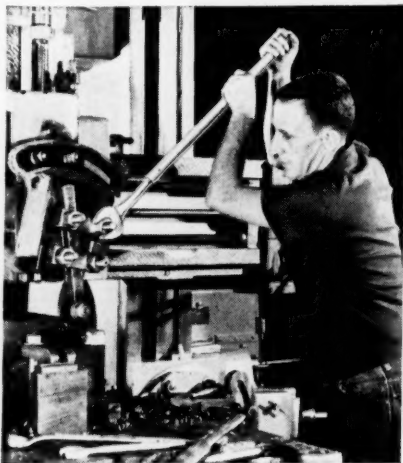


**TWENTIETH CENTURY
MANUFACTURING CO.**

**ROUTE 176 and BRADLEY ROAD
BOX 429M, LIBERTYVILLE, ILL.**

**Heavy-Duty Open-End Wrench Is
Used with Detachable Tubular
Handle**

Snap-on Tools Corp., Kenosha, Wis., has announced a heavy-duty open-end wrench which is designed for use with a detachable tubular handle for heavy nut turning. On most applications, the wrench is used to "run down" a nut quickly. Then the tubular handle is attached to provide increased leverage for final tightening. The wrench



Snap-on Heavy-Duty Open-End Wrench with detachable handle in use

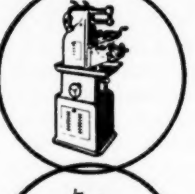
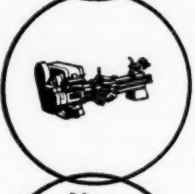
has a spring-mounted locking button which fits into a hole in the tubular handle to lock the wrench and the handle securely together. The button must be depressed with a nail or similar object, thus eliminating accidental separation. The head of the wrench is set at a 15-degree angle to the handle so that nuts can be turned with only a 30-degree handle movement when space is restricted.

The wrench is available in 10 sizes ranging from 7/8 to 1 1/2 inches. Three different length handles, which fit two or more sizes of wrenches, can operate

SHELDON

CHICAGO

U. S. A.



Write
for Catalog



OFTEN PAYS OUT ON THE FIRST JOB...

and gives additional years of "cost free" service.

In the past, lathes were generally bought as large and as heavy as possible to insure accuracy and sufficient power. Now, with accurate, low-cost Sheldon Precision lathes, it is more profitable to buy these faster, cost-cutting lathes for the specific job at hand just as you would buy jigs and fixtures.

In savings of tooling costs, operator cost, power cost, and plant loading, as well as extra profits from more pieces per hour, Sheldon lathes often pay back their cost on a single run.

Sheldon lathes will work to the closest tolerances—have "Zero Precision" Taper Roller Bearings. They can take a healthy cut when operating at high speed direct drive—have double V-belts to the spindle. They will swing 10", 11", or 13" and have a 1 1/2" hole through the spindle—have sufficient capacity for the great bulk of lathe work. Sheldon lathes have created a new factor for figuring machinery costs. They are tools you should know about.

SHELDON MACHINE CO., INC.

4250 N. Knox Ave.

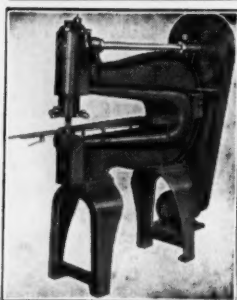
Chicago 41, Illinois

the complete series of wrenches. The handles can also be used with straight and offset type Boxockets which are also available.

Concentrated Solvent Emulsion Cleaner

Brulin & Co., Inc., Dept. 312, 2939 Columbia Ave., Indianapolis 7, Ind., has announced the Brulinsolv Concentrated Solvent Emulsion Cleaner for

SAVAGE NIBBLING MACHINES



"NIBBLE YOUR COSTS"

FOR TUBE SLOTTING, TUBE SHAPING AND FAST AND ACCURATE CUTTING OF FLAT SHEETS BY TEMPLATE OR TO A SCRIBED LINE

W. J. SAVAGE COMPANY
Knoxville Since 1885 Tennessee

PIONEER MFRS. OF NIBBLING MACHINES

CAPACITIES
UP TO
3/4"

—
ASK FOR
FREE BULLETIN
"J".
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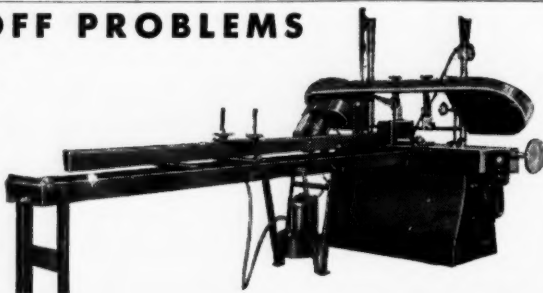
Illustration showing Brulinsolv Concentrated Emulsion Cleaner being used in cleaning an engine

cleaning oils, grease, and dirt from metal surfaces. When mixed with low cost solvents, such as kerosene, the concentrate is said to step up the cleaning action of the solvent, permitting flushing of the surface with water. According to the manufacturer, the concentrate is safe to use, non-toxic, non-corrosive, and has a pleasant odor. Brulinsolv, it is claimed, may be used for cleaning machinery and equipment, office machines and typewriters, aircraft surfaces, painted or unpainted concrete floors, and so on. The cleaner is also said to be safe for cleaning hands.

SOLVE CUT-OFF PROBLEMS

Do a REAL job—faster and at lower cost. Our Models M, D, and J feature simplified hydraulic controls for both full and semi-automatic operation. Bar feed (shown here on Model M), other accessories, and hinge-type saws also available. Write for literature.

W. F. WELLS & SONS
Three Rivers, Mich.



High Speed "Controlled Tapping"

**Saves Taps . . .
Stops Spoilage . . .**

"Controlled Tapping" is the nearest to automatic tapping perfection yet developed! AND users of Proconier Tapping Heads have been enjoying this advantage for many years. "Controlled Tapping" action is made possible by a unique, exclusive clutch design. It's the heart of the tapper—and operates with a smooth, sensitive "cushioned action." The tap driving power is automatically regulated by the pressure applied through the drill press spindle. Large or dull taps require more pressure and driving power than smaller, sharper ones—and "green" as well as experienced operators can quickly detect dull or loaded taps by the "feel" or pressure applied. The acute sensitivity of the clutch results in less tap breakage, fewer spoiled pieces and makes it easier to maintain high production schedules and output.



Important too, the clutch is kept dry—no excess oil reaches the friction surfaces to impair sensitive reaction to tapping pressure which is so necessary for precision tapping at high speeds.

This is only one of the many exclusive features and advantages that have made Proconier Tapping Heads the favorites in the industry. Learn how you too, can produce more, for less—faster and longer with Proconier.

Write for FREE Brochure
Giving full particulars on the
complete line of Proconier
Tapping Equipment.

Proconier
Safety Chuck Company

12 S. CLINTON ST., CHICAGO 6, ILL.



**New
TRU-GRIP
Tap
Holder**

The exclusive Proconier "Tru-Grip" tap holder is lighter, smaller in diameter. It affords easier tapping close to walls or shoulders, eliminates "chewed" tap shanks. Holds tap true.

PROCONIER SAFETY CHUCK CO.

12 S. Clinton St., Chicago 6, Ill. Dept. 2

Gentlemen: Please send your illustrated brochure giving complete details, specifications and prices on the improved line of Proconier High Speed Tapping Heads.

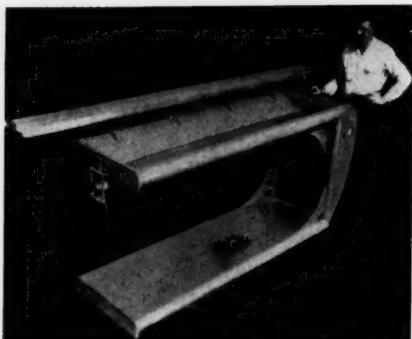
Name

Address

City..... Zone..... State.....

Longitudinal Welding Fixture

Airline Welding and Engineering, 785 N. Prairie Ave., Hawthorne, Calif., has announced a longitudinal welding fixture featuring numerous individual fingers for holding and aligning any metal of almost any thickness in almost any shape. According to the manufacturer, the fixture allows for the use of any of the automatic welding processes, as well as hand weld-



Airline Longitudinal Welding Fixture

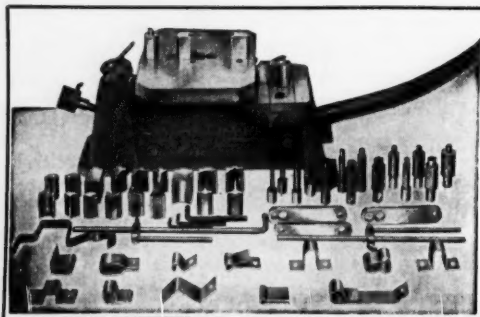


ing. A rotating mandrel accommodates several copper backup bars, any one of which can be rotated into position with a minimum of effort.

The fixture, it is claimed, permits metal thicknesses from 0.005 to 1 inch to be welded without a major change. When using the fixture, flat sheets, as well as open ended parts, may be welded. The fixture can be supplied complete with carriage, torches, heads, and power supply if desired.

Unit Is Designed for Production Chilling for Stabilization

A low-temperature chilling machine which is designed for production chilling of ball and roller bearings for stabilization has been announced by Sub-Zero Products Co., 3930-S3 Reading



Multiform BENDER CUTTER

Users report the Multiform Bender one of the handiest tools in the shop. No special tooling . . . Bends, Cuts, Punches, Flats, Rounds into Any Shape, Clamps, Brackets, Springs, Busbars, Wire Forms, Aircraft Work, Steel Rule Dies, Etc.

**AIR OR HAND MODELS FOR UP TO
1/4" to 4" MATERIAL**

Write for brochure which illustrates and describes the four bender models.

J. A. RICHARDS CO.
Dept. 6-M Kalamazoo, Mich.

JOHANSSON

Model 8-18 Drilling Machine

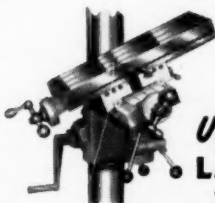


*Never before
a tool
like this!*

Geared Head—NO V-Belts and pulleys. 8 speeds—125 to 1540 RPM merely by shifting gear levers. LOW speed and power for large holes—HIGH SPEED for fast, accurate small holes.

Exclusive Patented "Drill Ejector". Reversing handle ejects drill for fast tool changes—no stopping to knock out drills.

More rugged, compact head—contains 1 HP motor, selective gear box, heavy-duty drilling spindle within single casting.



Universal LAYOUT TABLE

Unlimited possibilities for quick, accurate set-ups on tool-room or production jobs.

6" x 18" size, 6" x 12" travel, angular movement up to 80° in either direction. Large dials and ground feed screws provide drill jig accuracy for laying out holes. Also with end mill holder in spindle for precision milling and related operations.

Write for FREE Bulletin

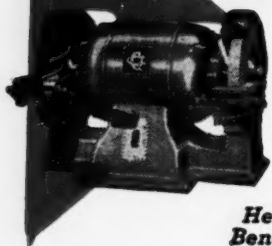
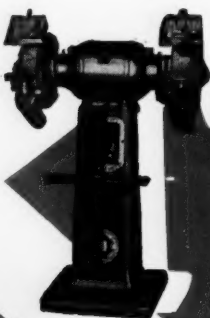


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Low
Priced**

The
I. O. Johansson Co.
7730 Austin Avenue
Skokie - Illinois

"Time Savers in any shop"

**Heavy Duty
Floor Grinder**



**Heavy Duty
Bench Grinder**

Here's extra value in long life, low maintenance and low first cost. **QUEEN CITY** Bench and Floor Grinders and Buffers have all the quality features . . . ball bearings, heavy duty motors, etc. . . . in a complete range of sizes and models . . . all priced far below comparable grinders and buffers.

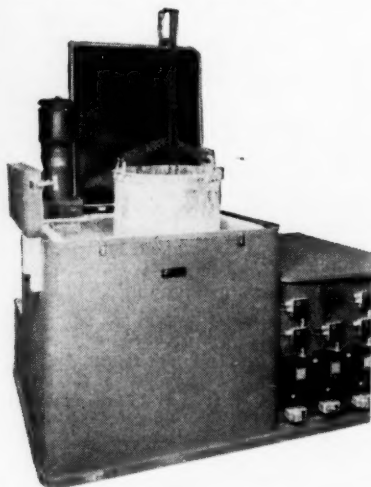
**QUEEN CITY
MACHINE TOOL CO.**

**WRITE TODAY
FOR DETAILED
LITERATURE**

QUEEN CITY MACHINE TOOL CO.

3911 Kellogg Avenue, Cincinnati 2, Ohio

Rd., Cincinnati 29, Ohio. The unit is factory adjusted to operate at 120 degrees below zero and, it is claimed, can be operated as low as a minus 150 deg. F. The machine has a capacity of 22 cubic feet and a thermal capacity of 4,000 B.T.U. per hour. Bearing parts are loaded from the oil quench into a perforated basket and placed in the chilling chamber by means of a mechanical lift. To gain rapid heat transfer and permit rapid chilling of bearing parts, the chamber is filled with a convection fluid, Freon 11. A



Sub-Zero Low-Temperature Chilling Machine

twin-blade agitator is mounted in the corner of the chamber to drive the fluid down a draft tube, through a manifold, and up through the basket of parts.

The chilling chamber is made of 7-gauge steel for strength and safety and measures 38 inches long x 32 inches wide x 36 inches deep. Outside dimensions of the unit are 84 inches long x 61 inches wide x 50 inches high. The lid of the unit is counterbalanced to stay open in any position, leaving both hands free.

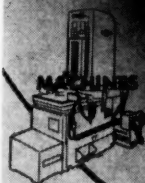
"WE GET BROACHING SERVICE"

*by Master Mechanic
Leading Automotive Parts Maker*

We have been relying on Colonial Broach Company for all phases of broaching—engineering, manufacturing, and service—for over 25 years. Several of our Colonial 10-ton pull-ups and horizontals have been in continuous use, at times on a three shift basis, since 1936, broaching gears, splines, etc., for tractor and automotive transmissions. Today, over 80% of the broaching machines in our shop, on both internal and surface broaching operations, are Colonials.

Engineering cooperation on fixture design from Colonial is the best. We get exactly what we require for both internal and surface broaching applications, and we get it promptly.

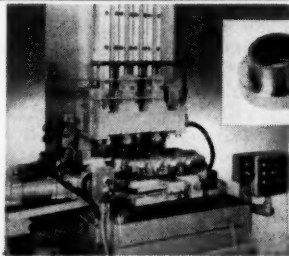
Colonial supplies the greatest percentage of our broaches. Design, accuracy, broach life, and resharpening service are all that we could ask. In all our 25 years of dealings, Colonial has never failed us when we had to have something in a hurry.



BROACHES



Unified Broaching



2-STEP BROACHING—280 GEARS per hr.

Four tangs on 280 automotive oil pump drive gears per hour are broached in two steps on a Colonial RS-10-54 single ram broaching machine. Tangs are 0.345" x 0.431"

Four parts are broached on one side of a 180° indexing shuttle fixture, while broached parts are unloaded from outside stations, semi-finished parts are moved from inner to outer stations, and blanks mounted on inner stations. Fixture recedes, indexes 180° as broach returns, then advances to broaching position, and cycle is repeated.

This is a Colonial Unified Broaching Installation

Machine Grinds Parts Having Multiple Diameters Simultaneously in Single Cycle

Designated as the Type CM-1, a heavy-duty semi-automatic multi-wheel grinder which is designed for grinding parts having multiple diameters, such as transmission and motor shafts and the line bearings of crank and camshafts, simultaneously in a single automatic plunge-grind



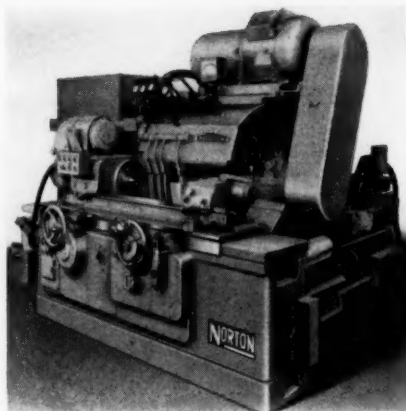
PRECISION
ACCURACY



FLAT
BOTTOM
WOODRUFF KEYS

M-1

STANDARD
SINCE 1872
HORSE NAIL CORP.
NEW BRIGHTON, PA.



Norton Type CM-1 Heavy-Duty Semi-Automatic Multi-Wheel Grinder

cycle has been announced by Norton Co., Worcester 6, Mass. The machine incorporates a heavy wheel spindle with a body diameter of 12 inches, supported at each end in cartridge-type bearings. Multiple wheels, 36 inches in diameter, are carried on the spindle body between bearings to a maximum overall span of 30 inches, including spacing collars. Heavy proportions throughout the wheel head, which moves on widely-spaced 74-inch long ways, are said to contribute to fast grinding action and fine finish.

A hydraulically-operated wheel truing device is mounted on the wheel slide at the rear of the wheel guard



Multiple Spindle Drill Heads

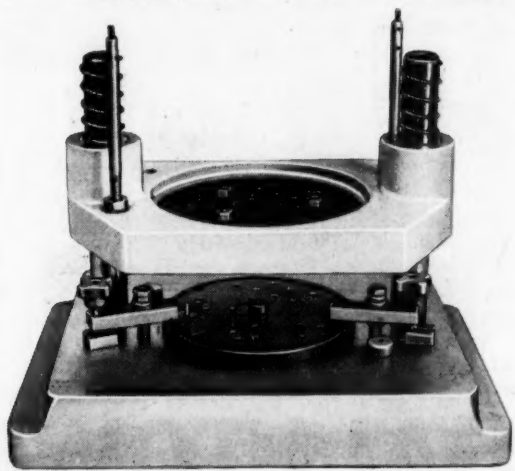
DURANT offers everything you need in top quality, high production multiple spindle drilling equipment with the broadest and most versatile line of standard models available, ranging from 2 to 20 spindles. All allow quick adjustment; eliminating high cost set ups. Models adjust as close as $\frac{3}{16}$ " on centers. Custom built models made to your specifications. Write for free catalog.

DURANT TOOL SUPPLY CO.

155 ORANGE STREET, PROVIDENCE 3, R. I.

HERE'S THE NEW **Zagar**

Standardized Self-Clamping DRILL JIG



Zagar Drill Jigs are used in conjunction with Zagar gearless multiple-spindle drill heads to ream, drill, tap on standard drill presses and tapping machines.

4 types—9 sizes, 5 combinations per size—hole patterns 3" through 15" dia.

**Nothing
Else
Like
It!**

SPEEDY—ACCURATE—RUGGED . . . A new concept to reach new production highs! Standardization means quick delivery and attractive price, since only a very few minor parts have to be made. Extremely fast; the operator merely feeds the parts—the Zagar Self-clamping Drill Jig does the rest. Proven design insures maximum accuracy.

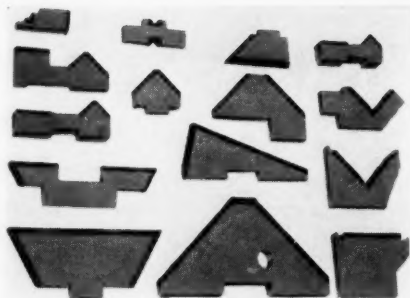
Ask for Our New Data Sheet "S-2".

ZAGAR TOOL, INC., 24000 LAKELAND BLVD., CLEVELAND 23, O.

Zagar

**TOOLS FOR INDUSTRY
and SPECIAL MACHINERY**

and consists of individual truing units for each grinding wheel. Compensation for wheel diameter reduction is automatic, the wheels being adjusted forward automatically toward the work the same distance as the diamonds are fed into the wheels during truing. The automatic grinding cycle includes work and coolant control, rapid wheel head advance, grinding feed, dwell, and rapid return. The cycle operates under electrically-timed control; however, a selector switch for optional manual control is provided.



OK Bedways

Bedways Are Available in Wide Variety of Shapes and Sizes

Ohio Knife Co., Dept. 29, Cincinnati 23, Ohio, has announced a wide variety of bedway shapes and sizes, manufactured by welding long-wearing high-grade tool steel to a soft steel backing under 2,500 tons pressure. The ways are specially heat treated

and hardened (65-66 Rockwell "C") to a uniform depth of 3/16 inch, the hardened surface helping to maintain constant accuracy. The hardened ways and gibs are said to be ground to tolerances of plus or minus 0.0002 inch. The ways are available in standard types or can be made to users specifications.

MARSHALLTOWN

OPEN BACK INCLINABLE PUNCH PRESSES

Soundly Engineered — Ruggedly Built for
PRECISION & ECONOMY



Write today
for
literature

- All bearings honed to exact sizes, guaranteeing perfect fit and alignment.
- Matched unit slide and gibs pre-finished by precision lapping with newly developed process.
- Chrome molybdenum cranks, wrist pin connections.
- Easy to maintain — economical to operate.
- 5 to 70 tons capacity.
- 9 models.

MARSHALLTOWN MFG. CO.

MARSHALLTOWN, IOWA



Illustrated above is the reaming of a gear case for an escalator mechanism. A 2.98" diameter Whitman & Barnes shell reamer was used on this reaming operation by a large manufacturer of elevators to secure maximum production, best possible reaming results and reduced costs.

In the complete line of W&B reamers you will find a type and size for nearly every application—each reamer designed and manufactured to the highest standards. Thus, regardless of your reaming application, W&B reamers provide greater production, more holes per grind, longer reamer life, chatter-free operation and accurate holes having super-fine finishes. Be sure your every reaming operation is done with highest efficiency—specify W&B reamers.



OUR INDUSTRIAL DISTRIBUTOR
Can Give You Quick Service
On Whitman & Barnes Tools.
Contact Him Today!



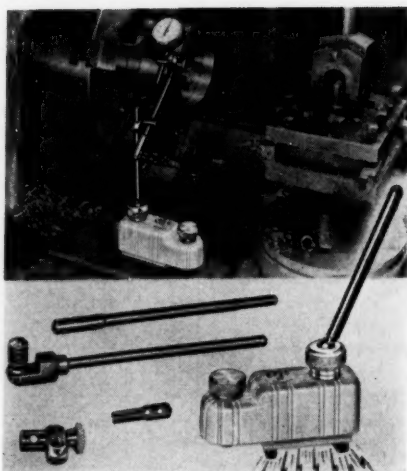
WHITMAN & BARNES

10050 Plymouth Road • Plymouth, Michigan

NEW YORK • CHICAGO • LOS ANGELES • HOUSTON • ATLANTA

Magnetic-Base Indicator Holder Has Pull of 125 Lb.

Designated as the "Tiny-Titan" No. 150, a heavy-duty magnetic-base holder which is designed to instantly mount test indicators up to 3 inches in diameter to flat surfaces or down to $\frac{3}{4}$ -inch round surfaces with a pull of 125 lb. has been announced by Enco Mfg. Co., 4524 W. Fullerton Ave., Chicago 39, Ill. The holder incorporates a ball swivel of brass and a stem of non-mag-



Enco "Tiny-Titan" No. 150 Heavy-Duty
Magnetic-Base Indicator Holder

netic material which isolates the magnet from the indicator. A knurled lock nut quickly and firmly secures the post position. The holder is supplied with a three-step universal rod 6 inches in length with diameter sizes of $\frac{7}{32}$, $\frac{1}{4}$, and $\frac{5}{16}$ inch to accommodate practically all indicators. A swivel adaptor is said to allow full 360-degree adjustment in all directions.

Steel parallel chamfered bars measuring $2\frac{1}{2} \times \frac{1}{4} \times \frac{1}{4}$ inches run lengthwise along the bottom of the unit, providing the magnetic contact surface. The holder is furnished in a non-break-

JIG BORING

Done to your specifications
WE HAVE

12 JIG BORERS

Including the largest
PRATT & WHITNEY Made
BLOOMFIELD TOOL CORPORATION

37 FARRAND ST.

BLOOMFIELD, N. J.

Carbide Tipped Tools Work Better in a

Clark ADJUSTABLE
TOOL HOLDER



Exclusive vise grip jaw runs full length of cutting channel... hugs bit so it can't rock, chatter, slip, sag or break... permits faster feed, deeper cuts! Holds all sizes—square, round, undersize or narrow bits for cutting off or special forming operations. Also available with 15° cutter channel for H.S.S. tool bits.

For complete information call your Clark
Cutter Jobber now or write Factory B

ROBERT H. CLARK COMPANY
9330 Santa Monica Blvd. • Beverly Hills, Calif.

Manufacturers of Precision Cutting Tools



DRILL THESE HOLES
BY A QUICK, EASY, INEXPENSIVE METHOD
Your business letterhead will bring literature.

WATTS BROS. TOOL WORKS
Wilmerding, Pa.

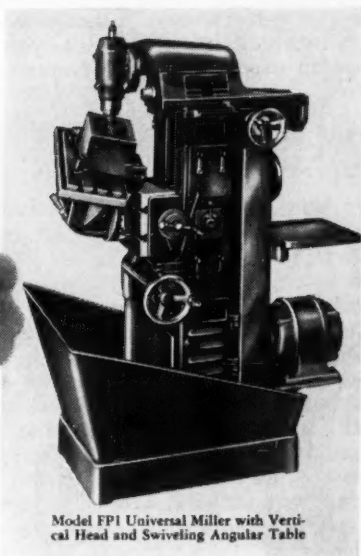
Complex

MACHINING

SIMPLIFIED WITH VERSATILE

DECKEL UNIVERSAL MILLERS

When your job sheets call for horizontal, vertical, angular or spiral milling—drilling—boring or slotting, plan the job for one machine—a Deckel FPI Universal Miller. You will find it the most efficient machine to do *all* these operations—accurately, easily and economically. With the various attachments, work holders and indexing fixtures you can produce complicated tools or parts with one set-up and eliminate costly special tools, jigs or fixtures.



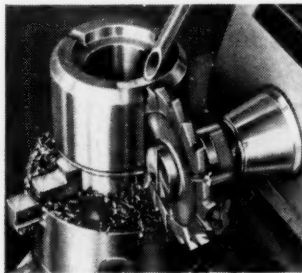
Model FPI Universal Miller with Vertical Head and Swiveling Angular Table

Other Deckel Machines for Tooling & Production

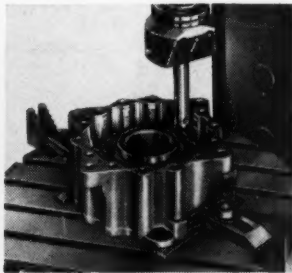
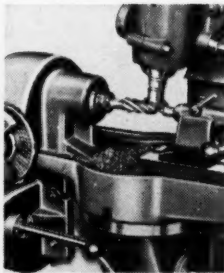
- 2 DIMENSIONAL ENGRAVERS
- 3 DIMENSIONAL ENGRAVERS
- UNIVERSAL PANTOGRAPH DIE SINKER
- UNIVERSAL TOOL & CUTTER GRINDERS

Boring a barrel-type pump housing on the FPI using the Universal Facing & Boring Head and Circular Table with Indexing Mechanism

Slot milling using Universal Index Head



Milling flutes of a tapered cutter with Spiral Milling Attachment



See how the DECKEL Universal Miller can simplify your complex multiple machining operations. Write for complete catalog or ask that a Cosa engineer discuss with you the advantages of these practical machine tools.

COSA CORPORATION

405 Lexington Ave., New York 17

IN DETROIT AREA contact DETROIT-COSA CORPORATION, 16923 James Couzens Highway, Detroit 33, Mich

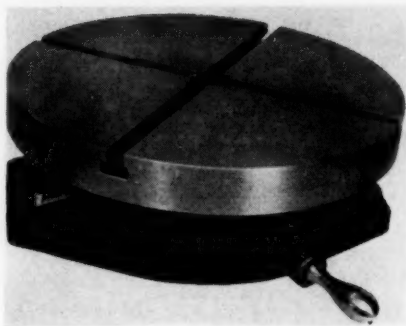
Your source for all Precision Machine Tools—
from Small Bench Lathes to Large Boring Mills

able, green Tenite plastic case which is 1¼ inches wide x 4 inches long x 1½ inches deep and which has vertical ribs to permit deftness of manipulation.

Improved Rotary Table Is Intended for Quick Manual Rotation

An improved cam-locking rotary table intended for quick manual rotation for use in assembly and sub-assemblies has been announced by Troyke Mfg. Co., 4422 Appleton St., Cincinnati 9, Ohio. The table, it is claimed, can support a substantial weight, can be locked in any position, and can be used for all assembly operations of small and medium size parts, such as scraping cross slides of a lathe, drilling and tapping various holes around a part in assembly, and minor machining operations.

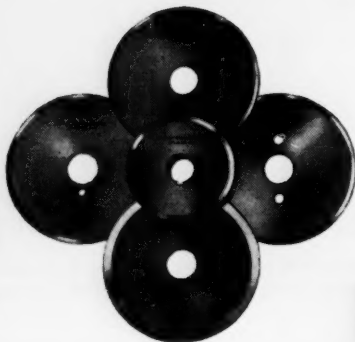
The table is hand scraped on two



Troyke Improved Cam-Locking Rotary Table

bearing surfaces to fit the cast iron base. Locking of the table is accomplished by quick-action cams, and the center bearing is adjustable to take up any wear that may occur. The periphery of the table can be graduated in degrees and quick-positioned for any angular movement.

Continental CUT-OFF WHEELS CUT MORE PIPE PROFITABLY



These wheels feature Continental's exclusive "True-Angle Bevel" for faster, cleaner cuts—and more cuts between sharpenings. For all makes of rotary cut-off machines. *Also, Manufacturers of Cut-Off Machines . . . Chaser and Wheel Grinders. Request Circular, Today.*

Continental MACHINE CO.

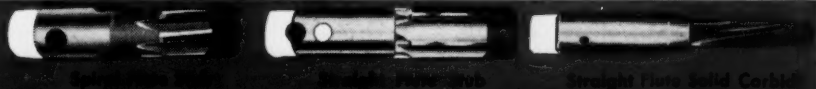
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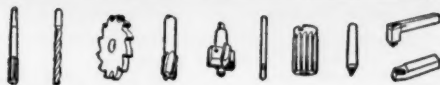
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All Types!*



Ask for Standard Carbide Reamer Circular No. 542 for complete data and prices. Special reamers also made promptly to your specifications.



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TOOL COMPANY

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Holder Accommodates Drills, Taps, and Similar Tools

Designated as a "Crib Block," a heavy cast iron holder which is designed for holding drills, taps, reamers, center punches, and a wide variety of similar type tools has been announced by A. E. Rineer, Box 188, Centerville, Ohio. The block is made of cast iron, providing a heavy base which is difficult to upset. The block is available in five sizes with screw sizes ranging



Rineer "Crib Blocks" in use



waiting for you

Gone are the days when you had to wait for delivery on most punches and dies while they were made to order. *Now they wait for you.*

You can order for *immediate shipment from our stock*, 76 styles of punches and 65 styles of dies in round, flat, oval, and square sizes to fit most makes of presses.

Besides this saving of time, *you save money.* Send for our catalog sheets and check the lists of immediately available sizes and their prices.

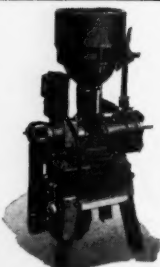
T. W. LEWTHWAITE MACHINE CO.

317 East 47th St., New York 17, N. Y.

from 2-6 to 1½-up and in overall sizes from 1 to 3 square inches. The block is available in a drill-your-own type or can be made to user specifications.

Couplings Adapted for Use with Taper-Lock Bushings

Three sizes of Type C couplings adapted for use with Dodge Taper-Lock bushings have been announced by Lovejoy Flexible Coupling Co., 5007 W. Lake St., Chicago 44, Ill. In addition to permitting easy fastening to shafting with the firmness of a shrunk-on fit, the couplings adapted to Taper-Lock bushings are said to permit carrying of a smaller number of coupling bodies taper bored for Taper-Lock bushings. The three sizes of the Type C couplings which are available for use with Dodge Taper-Lock bushings



for nut countersinking

Two KENT machines are available—the smaller for nuts up to 3/4" hexagon—the larger for nuts up to 1-7/16" hexagon.

Hopper fed. Duplicate work spindles countersink both sides of nuts simultaneously giving fast, economical production.

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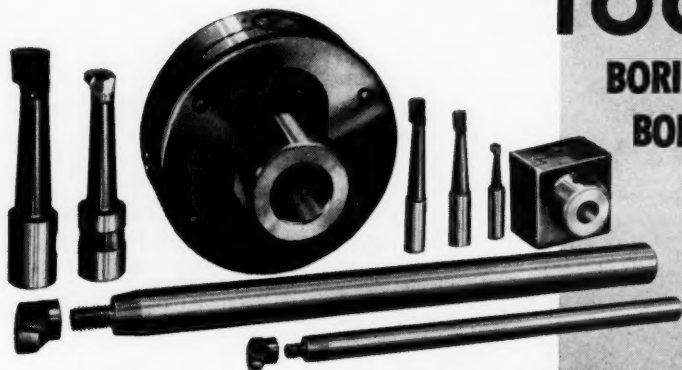
The KENT MACHINE CO., Cuyahoga Falls, O.

Drillers - Threaders - Slotters - Countersinkers - Bar Pointers

for more *Accurate* cuts...
greater *Rigidity* in

BORING TOOLS

BORING HEADS
BORING BARS



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BORING PROBLEMS? CLOSE TOLERANCE?

Try Criterion Boring Tools. Built with the same care and quality as the time-tested Criterion Boring Head.

THIS COMBINATION WILL PRODUCE RESULTS

Boring heads from 1½ to 7 inch diameter. Boring tools carbide or high speed steel, ¾ to 1¾ inches diameter. Bore holes from ⅛ to 20 inch diameter.

Accuracy for the closest tolerance • Rigidity for the heavy cuts • Heat-treated parts for long wear

LARGE OFFSET SAVES TIME AND TOOL CHANGES

These tools will cut your boring costs.

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MACHINE WORKS**

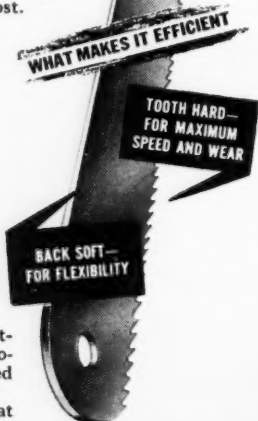
9312 SANTA MONICA BLVD • BEVERLY HILLS, CALIF.

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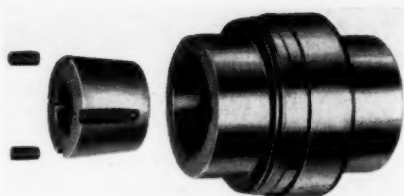
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SAW WORKS, INC. • MIDDLETOWN, N.Y., U.S.A.
Makers of Hand and Power Hack Saw Blades;
Frames; Metal & Wood Cutting Band Saw Blades.



Lovejoy Type C Coupling adapted for use with Dodge Taper-Lock Bushing

are No. C-191 (Dodge Bushing No. 2012) for bores from $\frac{1}{2}$ to 2 inches and Nos. C-226 and C-276 (Dodge Bushing No. 2517) for from $\frac{1}{2}$ to 2 $\frac{1}{2}$ -inch bores.

Silicon Carbide Wheel for Grinding Tungsten Carbide Tools

Marketed under the trade name "Si-Clone," a silicon carbide wheel for grinding tungsten carbide tools has been announced by The Fuller Merriam Co., 65 Water St., West Haven, Conn. According to the manufacturer, the wheel cuts fast and cool, incorporating a vitrified bond combined with a distribution of abrasive particles calculated to enable them to penetrate and cut tungsten carbide with maximum efficiency. The wheel is available in types for rough, semi-finish, and finish grinding operations.

FM "SiClone" Silicon Carbide Wheels



**"Packaged
Precision"**

**Measures high-precision
holes to fractions of
.0001", with
these advantages ---**



**Needs no wires
hose, electronic
gear or
heavy base**

Ready to go to work -

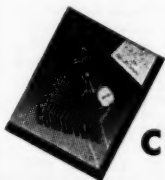
anywhere—at machine, inspection bench, selective assembly, Comtorplug can be wherever needed—instantly.

any time—hand Comtorplug to the operator and you're in business! No need for preplanning, installation of wires or hose; no headaches of electronic gadgets.

by anybody—in a few minutes any worker gets the knack of Comtorplug—its automatic features assure accuracy, and uniformity regardless of human variations—no training course or experience needed to use Comtorplug precisely.

PROMINENT IN THE JET ENGINE PROGRAM

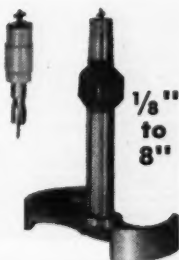
Any new, fast-moving program appreciates Comtorplug because it's so adaptable, accurate, rugged. Ideal for Statistical Quality Control. Send for details of this unique patented gage.



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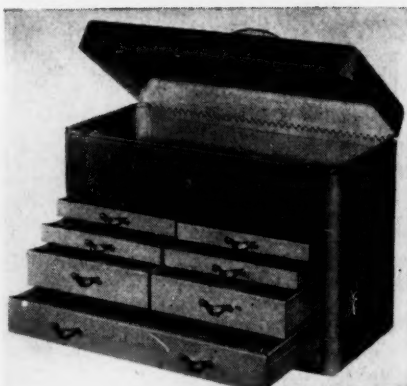
COMTOR CO.

64 FARWELL STREET
WALTHAM 54, MASS.



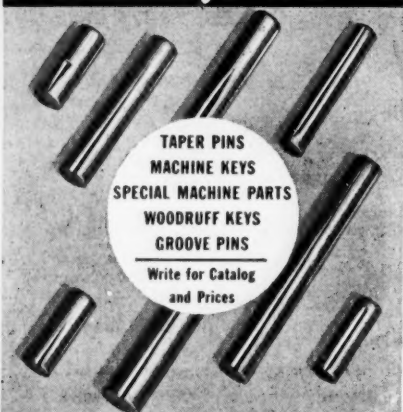
Machinists Chest Has One Positive Lock

Designated as the Model 104, a machinists chest which features a locking arrangement that completely locks the chest with just one turn of the key has been announced by Huot Mfg. Co., 538 N. Wheeler St., St. Paul 4, Minn. The chest has a top compartment, measuring $19\frac{1}{2}$ inches wide x $8\frac{1}{4}$ inches from front to back x $5\frac{1}{2}$ inches deep, for storing large, bulky



Huot Model 104 Machinists Chest

"Get them from Gillen"



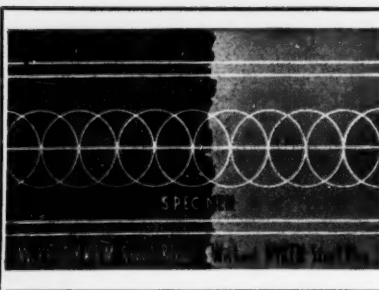
John Gillen Company
INC.
2542 SOUTH 50th AVENUE • CICERO 50, ILLINOIS

tools, such as hammers, gear pullers, and drill braces. The chest also incorporates seven drawers—four measuring $8\frac{1}{4}$ x $7\frac{3}{4}$ x 1 inch, two measuring $8\frac{1}{4}$ x $7\frac{3}{4}$ x 2 inches, and one measuring $17\frac{1}{4}$ x $7\frac{3}{4}$ x 2 inches. Each drawer is cork lined to protect precision tools, such as micrometers and calipers.

The chest has a smooth finish to afford fast and easy cleaning.

Straightedge Has Accuracy of 0.0002-Inch Per Foot

Available in lengths up to 72 inches, a black granite straightedge which is said to be finished to an accuracy of 0.0002-inch per foot has been announced by Collins Microflat Co., 2326 E. 8th



DYKEM STEEL BLUE

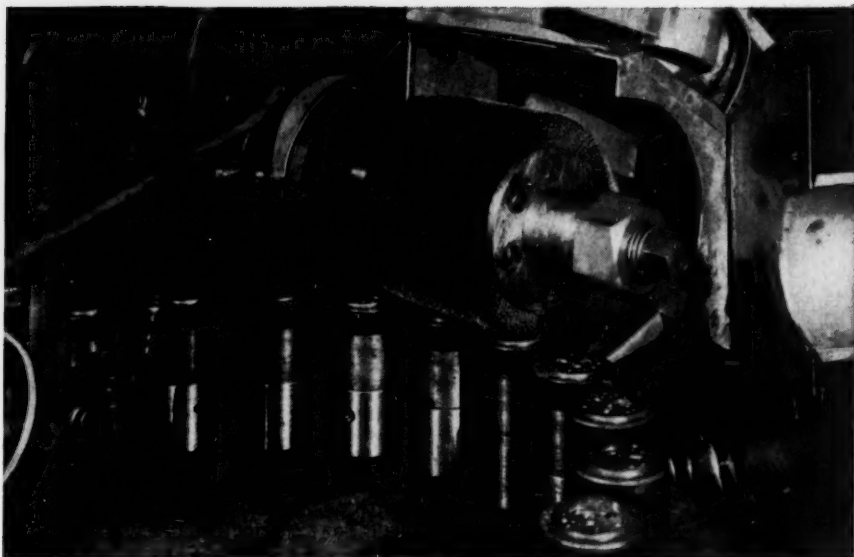
Stops Losses in Making Dies and Templates

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

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THE DYKEM COMPANY

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How to brush down finishing costs automatically

Power Brushing finishes both sides of these brass discs at a rate of 15,000 per machine per eight-hour day. It does a better, more uniform job many times faster than hand methods.

Parts are placed on spindles which rotate at 60 r.p.m. The table also turns at about one revolution in 25 seconds bringing the Osborn Economy Section Brushes into contact with each part in turn. Spindles stop rotating as they approach the loading station, where a mechanism lifts finished parts and air pressure blows them into a chute.

A similar automatic operation with Osborn Power Brushing may improve the quality and speed of *your* cleaning, finishing and deburring operations . . . whether you process large parts or small . . . made of metallic or non-metallic materials. Ask your nearby Osborn Brushing Analyst to appraise *your* possibilities. Write to *The Osborn Manufacturing Company, Dept. M-7, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

FREE: New booklet on deburring with Osborn Power Brushing. Ask for your copy.



The finished part. Osborn Power Brushing removes feather burrs and blends surface junctures.

Osborn Brushes



OSBORN BRUSHING METHODS • POWER, MAINTENANCE AND PAINT BRUSHES • BRUSHING MACHINES • FOUNDRY MOLDING MACHINES



Collins Black Granite Straightedge in use

St., Los Angeles 21, Calif. According to the manufacturer, the straightedge is non-warping, non-deflecting, easily washable, smooth, temperature inert, rigid overall, and moisture repellent. The ends are tapered and fitted with leather grips for easy, secure handling. An attractive wooden leatherette-

covered carrying case which is felt lined can be provided as extra equipment.

Spring Alloy Has General Industrial Application

Identified as Elgiloy, a highly corrosion and fatigue-resistant special alloy which has general industrial application has been announced by the Abrasives Division of Elgin National Watch Co., Elgin, Ill. Developed originally for watch mainsprings, the alloy is said to be suitable for making springs for firing pin retractors, projectile fuses, sewing machine electrical contacts, optical and motion picture equipment, and other products requiring similar spring characteristics. The alloy, it is claimed, can also be used for flapper valves and diaphragms. According to the manufacturer, Elgiloy is highly elastic, has

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Horizontal STOCK REEL

LOW COST — AUTOMATIC

No motors — No belts — No sprockets

POWERED BY THE NATURAL SPRING OF UNCOILING STOCK

JACO Stock Reel operates automatically . . . without attention or maintenance . . . so simple there is nothing to get out of order.

The loop of stock between the Coil and the Press Feed completely eliminates slippage, kick-back and over-run.

JACO Stock Reels handle all types of resilient coiled stock for light stampings up to 250 lb. coil weight . . . up to 36" coil diameter . . . up to 6" stock width.

Proved in actual use by major manufacturers. Guaranteed to work on your job or money back.



JACO

DEVICES, INC.

Hingham 6-0873

98 High Street, Hingham, Mass.



Even Our Salesmen Were Amazed!

—to see tap costs cut up to 75% with the



Savings on tap costs of as much as 50 to 75%—and more—are routine for metal-working firms now using the B.P.S.* System. Why not join the leaders in your industry—and save?

THIS IS THE B.P.S.* SYSTEM:

Follow these two simple rules: (1) Sharpen your taps at *regular, planned* intervals and (2) Sharpen flutes and chamfers of taps to the exceptionally high degree of accuracy which is possible only on Blake grinders.

WHY THE B.P.S.* SYSTEM ALWAYS WORKS:

Using the Blake Chamfer Grinder and Blake Flute Grinder, your operators can sharpen each tap precisely to correct any error in indexing and to control the rake angle. Then each tap *must* cut much more accurately, more uniformly, with less strain—and its working life is greatly increased. Longer life, due to this superior sharpening method, greatly reduces tap costs—because every tap gives far more service!

*Blake Precision Sharpening

HERE'S WHAT THE B.P.S.* SYSTEM CAN DO FOR YOU!



BLAKE CHAMFER
GRINDER



BLAKE FLUTE
GRINDER

- Gives much more production per tap!
- Greatly reduces tap costs!
- Provides greater tap accuracy and uniformity!
- Greatly reduces tap breakage and spoiled or unacceptable work!

INVESTIGATE THE B.P.S.* SYSTEM NOW!

Write us for reprints of *American Machinist* and *Machinery* articles on this subject. Descriptive folders on both Blake grinders also available.



EDWARD BLAKE COMPANY



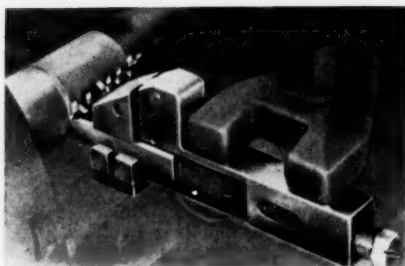
438 CHERRY STREET • WEST NEWTON 65, MASS.

Black Diamond Precision Drill Grinders • Waltham Cutter Sharpeners • Surface Finish Standards

high tensile strength, and can be soldered, welded, brazed, punched, or formed. Machining is said to be best accomplished with carbide-tipped tools.

Toolholder Absorbs Vibrations and Shocks

Identified as the "Recoiler," a toolholder which is designed to absorb vi-



American "Recoiler" Toolholder in use

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ROTARY, INDEX, MILLING TABLE
The ONLY TABLE Having ROTARY FEED
Combined With
DUAL CROSS FEEDS

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Turns Your
DRILL PRESS
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VERTICAL
MILLER

This PALMGREN TABLE is sensational in price, construction and performance. Just what shops need for accurate, precision work. You can mill straight or curved, slot, drill, also rout, rabbet, mortise and sand on wood. Do hundreds of jobs as milling slots, grooves, keyways, squares, hexagons, curves, flats, dovetails, indexing and laying out work.

Designed for use on Drill Press or Milling Machine. It handles all types of metal and woodworking operations and makes your drill press a vertical milling machine. Precision built. It permits close tolerances. Rotary Feed is calibrated in degrees. Cross Feeds in thousandths. Cross slides and feeds are $2\frac{1}{4}$ " each side of center— $4\frac{1}{2}$ " overall. Has Acme thread cross feed screws, adjustable gibbs on cross slides—40 to 1 worm and gear ratio in rotary feed. 4 Bolt slots—2 lock screws.

No. 83 Table Dia. 8", T-Slots $\frac{1}{2}$ ", Base Keyway $\frac{1}{4}$ ", Base Dia. $6\frac{1}{4}$ ", Ht. 5", Wt. 37 lbs. Price \$54.50

Order Today! Write for New Catalog No. 201

CHICAGO TOOL and ENGINEERING CO.
8399 South Chicago Avenue, Chicago 17, Ill.

brations and shocks occurring when turning rough surfaces or out-of-round work has been announced by American Tooling Corp., 60 E. 42nd St., New York, N. Y. According to the manufacturer, the head of the toolholder is connected to the body by a specially-designed linkage which holds the cutting tool at a constant angle. All shocks and vibrations are transmitted to a rubber spring pack located inside the shaft of the toolholder. The ability of the spring pack to absorb vibration and shock can be regulated by adjusting a stop bolt and the end of the shaft of the toolholder.

The holder can be used for left or right-hand operations and for cutting, parting, and threading. Available with the holder are high-speed cobalt bits and carbide tool bits in all standard forms and grades. The toolholder is available in seven sizes ranging from $5\frac{1}{2}$ to 12 $\frac{1}{2}$ inches in length.

HI-LO

Variable Speed Pulleys provide a most efficient and inexpensive speed control for all types of machinery. A patented feature of Hi-Lo Pulleys is the cam action within the pulley which automatically regulates belt tension actually required to carry the load. Hi-Lo Pulleys maintain constant speed at any speed setting. Hi-Lo Pulleys use standard V belts, obtainable at any supply house.

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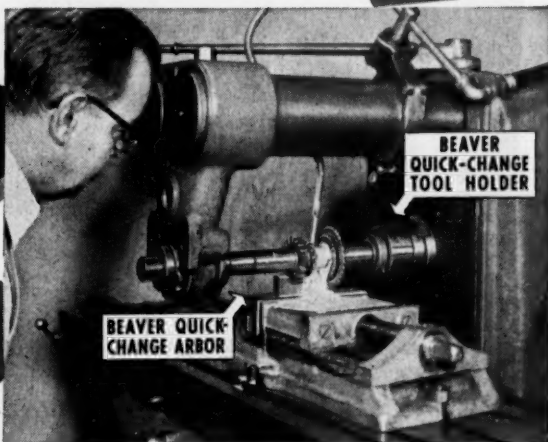
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WITH *Beaver* QUICK-CHANGE TOOLING
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Beaver Quick-Change Arbors for all slotting, face, straddle, and gang milling save machine time, improve quality, and hold accuracy on single, multiple, and transfer machine operations.

By using Beaver Quick-Change Arbors in Beaver Quick-Change Holders on your machines, down-time can be confined to the bench. This allows uninterrupted machine operation without costly reset-ups with each change of tools.

Beaver Quick-Change Arbors re-

duce trial and error rejects by holding a constant relationship between the flange and the collar of the arbor. Spacing of cutters can be accurately predetermined at the bench with simple "Jo" blocks or height gage and indicator.

With Beaver Quick-Change Arbors your machines are free of costly down-time and cutter change from one set-up to another is a simple, quick operation. Prove Beaver Quick-Change Toolings superiority on your own operations.

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TAPER REAMERS

for all types of die work



- Specially treated for modern die steels.
- Rapid cutting capacity.
- Large range of standard sizes.
- Tapers per inch: .005, .008, .013.

Write for
data sheets.

GAMMONS • HOAGLUND CO.
MANCHESTER 2, CONN.
Manufacturers of helical taper pin, chucking,
die makers and special reamers.

Pilot-Controlled Regulator Controls Air Pressure from 2 to 120 P.S.I.

Designated as the Series 20AC00, a pilot-controlled air pressure regulator designed for extreme precision in air control over a wide operating range, from 2 to 120 p.s.i. has been announced by C. A. Norgren Co., Englewood, Colorado.

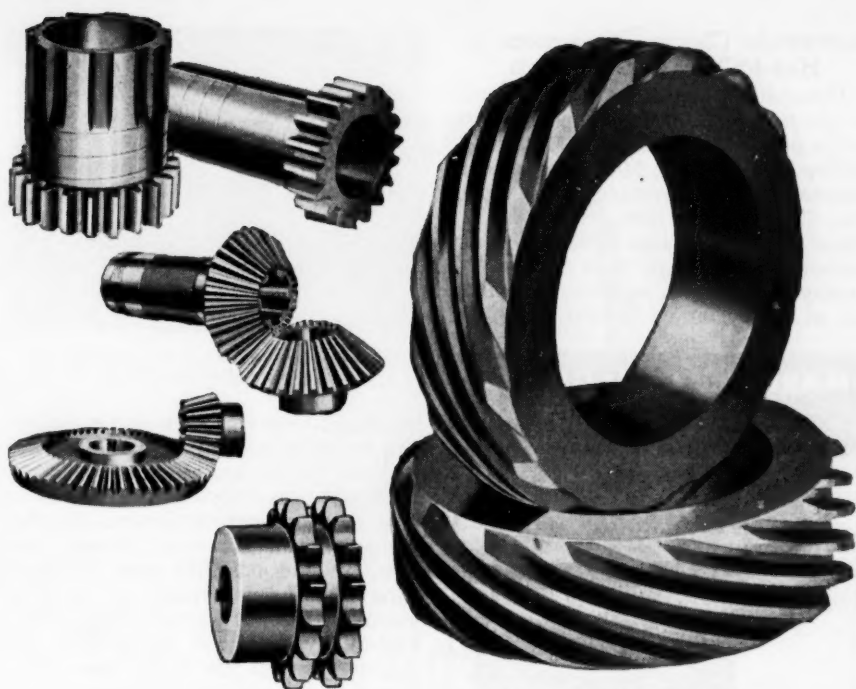
The unit is said to provide a pilot regulator and a pressure regulator in an integral unit. The regulator utilizes regulated air pressure to control de-



Operating display incorporating Norgren Pilot-Controlled Air Pressure Regulator

livered air pressure, minimizing the effect of fluctuating line pressures as a factor in delivering uniform working air pressure. According to the manufacturer, a light adjusting spring in the pilot control regulator makes regulation easy and precise and eliminates heavy adjusting springs. Balanced valve construction, it is claimed, provides accurate pressure control and maximum air capacity.

The pilot-controlled air pressure regulator is available in 1/2, 3/4, and 1-inch sizes.



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made **EXACTLY** to
your specifications

Regardless of quantity or type, you'll profit by specifying Adams custom made gears for your product. Made on the most modern gear cutting machines by skilled workmen, Adams gears are quality controlled to guarantee exact conformance to your specifications. Write today for further information. **THE ADAMS COMPANY**, 1942 Cypress Street, Dubuque, Iowa.

The ADAMS Company

Dubuque, Iowa, U. S. A.

ESTABLISHED 1883

FINE GEARS MADE TO
YOUR SPECIFICATIONS



Instrument Checks Dimensions to Half-Millionths of an Inch

Dimensional gaging in increments of one half-millionth of an inch is said to be provided by the Half-Millionths Micro-Ac Electronic Microcomparator announced by Cleveland Instrument Co., 735 Carnegie Ave., Cleveland 15, Ohio. The instrument consists of an induction-type gage head with frictionless movement, adjustably mounted on a rigid stand; and a drift-free



Cleveland Half-Millionths Micro-Ac Electronic Microcomparator

MARK and DEMAGNETIZE IN ONE OPERATION

THE
Luma
TOLEDO, OHIO
WAY



The Luma combination etchtool and demagnetizer, etches, demagnetizes, anneals and solders. Permanently marks hardest steel with ease of a pencil. Write for complete information.

Luma Electric Equipment Co.
P. O. BOX 132-M5 TOLEDO 1, OHIO

industrial-type amplifier with a meter. The meter, it is claimed, has two continuous linear scales which read 0.0000005 and 0.000001 inch per division, either side of center zero, and the respective measurement ranges are 0.000010 and 0.000020 inch. Other ranges and sensitivities can be provided for the less-sensitive scale. The half-millionths scale divisions are about 1/10 inch apart, and magnification is just under 200,000 times.

According to the manufacturer, the two scales can be used interchangeably at will, as selected by a knob on the panel, and both scales always give the same reading for any measurement within their range. Meter response is said to be rapid, permitting fast and accurate readings. It is claimed that repeat readings within one-quarter millionths of an inch can be obtained



Monarch Precision SHAPLANE Radius Tools

Illustration shows convex cutter for $\frac{1}{4}$ " to $2\frac{1}{2}$ " balls.

FIVE MODELS for LATHES, SHAPERS, PLANERS, BORING MILLS

Range $\frac{1}{2}$ " to 3" for concave Radii. Also heavy duty models for radii to 6" on planers, etc.

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HE has it...



the thing you want!

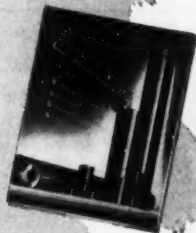
NO NEED to search through directories or ask people about it. When you need a finished bearing, a bar of bearing bronze or any other one of countless items of industrial materials and equipment, just phone your industrial distributor.

YOUR BUNTING distributor is the leading industrial distributor, or a stock-carrying specialist in certain industrial items. With money-saving convenience, he can supply hundreds of different sizes of completely machined and finished Bunting Standard Stock Industrial Bearings, Electric Motor Bearings and Precision Bronze Bars.

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Ask him
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Catalog which gives
complete dimensional
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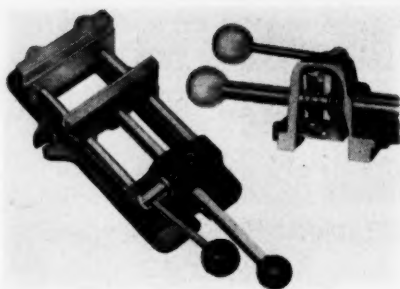
February, 1954

MODERN MACHINE SHOP 287

consistently. The instrument can be used in any room where the temperature is fairly constant and where there are no drafts or hot spots that would change the dimensions of the pieces being gaged.

Vise Features "Pumping Action" Locking Mechanism

Heinrich Tools, Inc., Dept. 113-M, Racine, Wis., has announced the "PA"



(Left) Heinrich "PA" Series "Grip-Master" Instant-Action Vise. (Right) Cutaway view of "Pumping Action" locking mechanism of "PA" Series "Grip-Master" Vise

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Cut time and cost in rivet spinning

These fast, sturdy, easily operated machines put your riveting on a production basis in terms of speed and low cost. We'll gladly demonstrate what they can do and the high quality of work they turn out. Send samples of your parts to be riveted and we'll give you time and cost estimates on handling your rivet spinning on a LINLEY. Sizes and types for iron and cold rolled steel rivets up to $\frac{3}{8}$ " ; larger capacity for rivets of softer materials.

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LINLEY BROS CO.

671 State St. Ext., Bridgeport 1, Conn.

Series "Grip-Master" Instant-Action Vise which features a "Pumping Action" locking mechanism. The jaw advances forward against the object to be held with the initial downward press of the locking lever, exerting holding pressures up to 1,500 lb. When the locking lever is released to a 60 to 80-degree angle, the jaw is held against the workpiece with a pressure of from 200 to 350 lb., allowing an additional forward motion of the jaw by "pumping" the locking lever. Thus, the vise is said to compress and securely hold difficult - to - hold materials, such as steel laminations, warped castings, wood sections, plastics, and others.

The "PA" Series Vise is available in four models with 3, 4, 6, and 8-inch wide jaws.

MILWAUKEE PRECISION EQUIPMENT

Surface Plates, Angles, Parallels, and Straight Edges are all backed by over forty years of practical experience. You pay no more for this added assurance of accuracy and durability.

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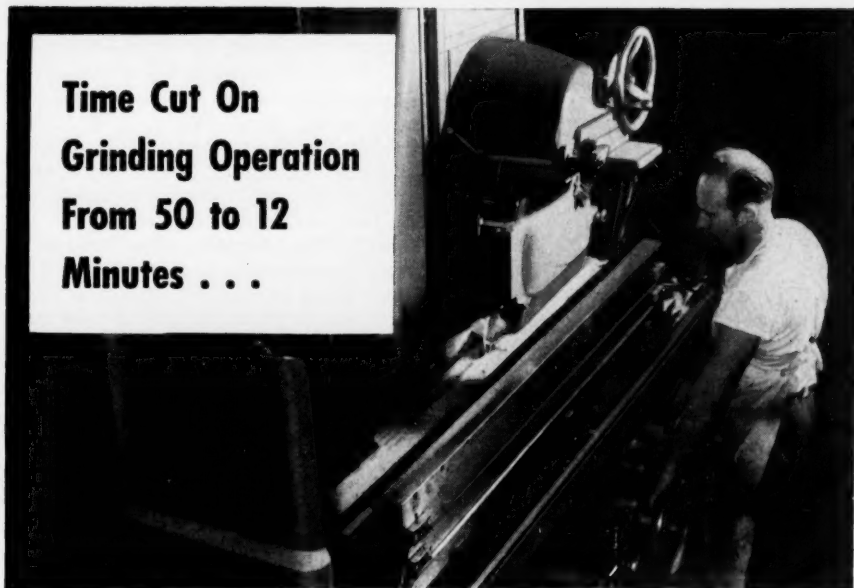
Engineers and Machinists Since 1907

126 E. Pittsburgh Ave.

Milwaukee 4, Wis.



**Time Cut On
Grinding Operation
From 50 to 12
Minutes . . .**



**With SUNDSTRAND
"POWER-GRIP"
Magnetic Chucks**

Here's another good example of time savings with Sundstrand Magnetic Chucks. Two airplane flap tracks are held at one time for grinding on opposite faces of rail. Grinding stroke is 70 inches. Former time with conventional

holding equipment was 50 minutes. With change to Sundstrand "Power-Grip" Chucks time is cut to 12 minutes . . . a savings of 38 minutes per part.

There's a good chance that you may be able to save considerable time in milling or grinding operations with Sundstrand "Power-Grip" Magnetic Chucks. Call in a Sundstrand Engineer. There is no obligation for this service.



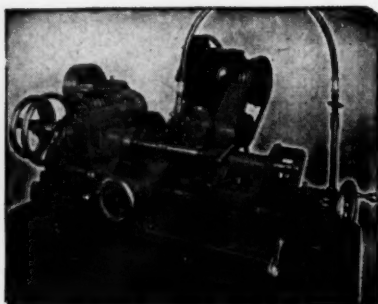
Free Data is available on Sundstrand Clamping fixtures. Write today. Ask for bulletin 540-M.



**SUNDSTRAND
Magnetic Products Co.**

Division of Sundstrand Machine Tool Co.
1020-9th ST. • ROCKFORD, ILLINOIS

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THREAD MILLING MACHINE

Also Pinion and Gear Cutting Machines, Cylindrical Sub-Presses, Cutter Sharpening Machines, Small Special Machinery. Cutters for thread milling and gear cutting.

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NAMEPLATE MARKING



Model No. 4

The nameplate on your product is your signature. Keep it neat and legible! Accurate location and alignment are assured with this

NAMEPLATE DETAIL PRESS.

- Simple Operation
- Perfect Alignment
- Uniform Depth

GEO. T. SCHMIDT, INC.



1806 W. BELLE PLAINE AVE.
CHICAGO • 13 • ILLINOIS

Improved Straightener Features Variable Speed Drive

Designated as the Model No. RS-67, an improved straightener which features a variable speed drive, thus enabling the control of the output speed to conform with the requirements of the job, has been announced by U. S. Tool Co., Inc., Ampere (East Orange), N. J. The machine has a capacity for material up to 6 inches wide x $\frac{1}{8}$ inch thick maximum in cold rolled steel and



U. S. Improved Model No. RS-67 Power-Driven Straightener in use

incorporates a pair of power-driven take-in rolls, seven plain straightening rolls, a pair of power-driven take-out rolls, and a 5-to-1 ratio variable speed drive. The output of the machine is said to be from 10 to 50 feet per minute. A mercury switch loop control arrangement maintains a loop of material between the straightener and the press or machine with which it is used. The straightener can also be employed for strip material.

Models are available with 10 and 12-inch capacities.

Sid Tool
Company

WHY WAIT FOR SPECIAL TAPS?

*Has them IN STOCK
for IMMEDIATE DELIVERY!*

HIGH SPEED SPECIAL RIGHT HAND TAPS

SIZE	THREAD	SIZE	THREAD	SIZE	THREAD
4	32-48-60-64	7/16	12-16-18-22-24-27-28-30-32-36-40	1-5/8	5 1/2-8-10-12-13-16-18-20-24
5	30-32-36-48-80	1/2	12-14-16-18-22-24-26-27-28-30-32-40	1-11/16	10-12-14-16-18-20-24
6	36-40-48-56-60			1-3/4	8-10-12-14-16-18-20-24
7	32-40	9/16	16-20-24-27-28-30-32-40-48	1-13/16	8-10-12-14-16-18-20
8	24-30-36-38-40-44-48	5/8	12-14-16-20-24-27-28-32-36-40	1-7/8	8-10-12-14-16-18-20-24
9	24-28-32-40			1-15/16	8-10-12-14-16-18-20-24-28
10	28-30-36-40-48-64	11/16	11-16-18-20-24-27-28-30-32	2	4 1/2-8-10-12-16-18-20
12	20-28-32-36	3/4	9-11-12-14-18-20-24-26-27-28-32	2-1/16	12-14
14	20-24-28	13/16	10-14-18-20-32	2-1/8	12-16-20
1 1/16	60-64	7/8	10-12-16-18-20-24-27-28-32	2-3/16	12-16
5/64	72	15/16	8-9-10-12-14-16-18-20-24-32	2-1/4	4 1/2-8-12-14-16-18
3/32	48			2-5/16	12-18
7/64	48-56	1-1/16	12-14-16-18-20-24	2-3/8	12-16-18
1/8	32-40	1-1/8	8-10-14-16-18-20-24-32	2-1/2	8-10-12
5/32	32-36-40	1-3/16	8-10-12-14-16-18-20-24	2-9/16	18
9/64	36-40	1-1/4	8-10-14-16-18-20-24-32	2-5/8	12-16-20
11/64	36	1-5/16	12-14-16-18-20-24-32	2-3/4	16
3/16	20-24-32	1-3/8	8-10-14-16-18-20-24	2-7/8	8-12-16
13/64	32	1-7/16	8-10-12-16-18-20-24	3	8-16
7/32	24-28-32	1-1/2	8-10-14-16-18-20-24-28	3-1/4	8-12-16
1/4	18-24-26-27-30-32-36-40	1-9/16	18-20-24	3-1/2	8-12-16
5/16	16-20-22-27-28-32-40			3-7/8	6
3/8	12-16-18-20-27-28-32-36-40-48			4	8-12



HIGH SPEED LEFT HAND TAPS

SIZE	THREAD	SIZE	THREAD	SIZE	THREAD
0	80	3/8	16-24-32	1-3/8	6-8-10-12-16-18-20-24
1	56-64-72	7/16	14-20-28	1-7/16	8-10-12-14-16-18-20
2	56-64	1/2	12-13-20-28	1-1/2	6-8-10-12-16-18-20
3	56	9/16	12-18-20-24	1-9/16	8-10-12-16-18-20
4	32-36-40-48	5/8	11-12-18-20-24	1-5/8	8-10-12-14-16-18-20
5	40-44	11/16	11-16-24	1-11/16	8-10-12-14-16-18-20
6	32-36-40	3/4	10-16-18-20	1-3/4	8-10-12-14-16-18-20
8	32-36-40	13/16	16	1-13/16	8-10-12-14-16-18-20
10	24-30-32-40	7/8	9-12-14-18-20	1-7/8	8-10-12-14-16-18-20
12	24-28-32	1	8-12-14-16-18-20	1-15/16	8-10-12-14-16-18-20
1/4	20-28-32	1-1/8	7-12	2	4 1/2-10-12
5/16	18-20-24-28-32	1-1/4	7-12-16-18		

• SPECIAL AND LEFT HAND DIES IN STOCK

Prices on Application—We are always adding new sizes

NOTE: Oversize—Undersize—Metric—64th—and 32nd Size Taps Available for Quick Delivery.

DEALER INQUIRIES INVITED

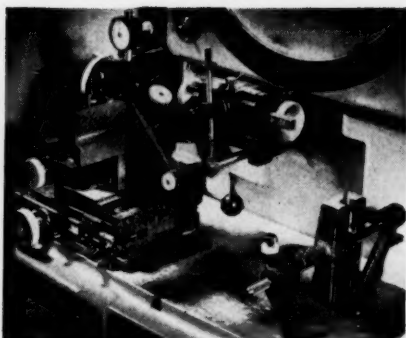
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CUTTING TOOL SPECIALISTS
120 LAFAYETTE STREET • NEW YORK 13, N. Y.

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PHONE: DE 3-4270

Instrument Inspects Gear Under Simulated Operating Conditions

Optical Gaging Products, Inc., 26 Forbes St., Rochester 11, N. Y., has announced a gear analyzer which is said to provide direct observation of a magnified gear image, allowing inspection, analysis, and gaging of the gear under simulated operating condi-



OGP Gear Analyzer

tions. According to the manufacturer, the instrument will check involute profile, fillet interference, o.d., pitch diameter, root diameter, backlash, tooth-to-tooth spacing, modified tooth form, tapered teeth, tooth crowning, first and last contact points, and off-axis teeth. The gear is viewed as it rotates in contact with, and at the correct center distance from, a composite rack chart. Analysis of the gear is made by observing the "running action" at a magnified projection on a Model 3 Kodak Contour Projector. The manufacturer states that the various elements of the gear are all clearly visible.

The instrument is capable of checking a wide range of gear sizes, no master gear being required for setting the unit.

CAMS

We are fully equipped to **GRIND OR MILL** a complete range of CAMS to your specifications on our **ROWBOTTOM** Cam Milling Machines.

Your inquiries answered promptly.

HIMOFF MACHINE CO., INC.

23-16 44th Road Long Island City 1, N. Y.

REID

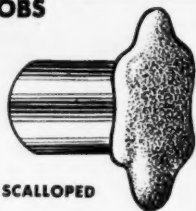
TOOL ROOM ACCESSORIES

C.I. HAND KNOBS

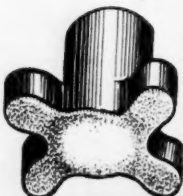


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CUT TOOL COSTS broken tools made like new again with **NU-TANGS**

Twisted or broken tangs replaced at low costs on any tool with a Morse Taper (sizes 1 to 6). Hundreds of leading industries save money on drills, reamers, countersinks, cutters, drivers, the **NU-TANG** way. Prompt delivery. Send for prices—or send tools for repair. All work guaranteed.

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We return them like this!

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**When you have to transmit
power at high speeds . . .
think of
S.S. WHITE
FLEXIBLE
SHAFTS**

Photo courtesy of
Precise Products Corp.
Racine, Wisconsin



DESIGNERS OF EQUIPMENT in which power has to be transmitted between two parts at high speeds will find S.S.White flexible shafts a convenient, economical and practical solution to problems of this nature. The shafts are designed to operate with a minimum of vibration and friction, and their performance is unaffected by misalignment or movement of either the driving or the driven part.

A remarkable demonstration of these characteristics is shown above, in which an S.S.White flexible shaft drives the hand-piece of a Precise portable grinder-miller. With the electric driving motor developing up to 1/4-hp at speeds ranging from 20,000

to 45,000 rpm this tool is capable of correcting hardened steel dies with a tungsten carbide milling cutter without first annealing the die. According to the manufacturer, the success of the application is "due to the very high speed of the Precise grinder-miller and due to the excellent torque transmission possible through the flexible shaft — and what is equally remarkable is that the shaft runs cool and without vibration at such very high speeds."

The help and assistance of S.S.White engineers in working out your own flexible shaft applications is always available. Take advantage of it — there's no obligation.

SEND FOR THE 256-PAGE FLEXIBLE SHAFT HANDBOOK

It contains full facts and data on how to select and apply flexible shafts. Copy sent free if you request it on your business letterhead.



THE *S.S. White* INDUSTRIAL DIVISION
DENTAL MFG. CO.



Dept. 5, 10 East 40th St.
NEW YORK 16, N. Y.

Western District Office • Times Building, Long Beach, California

Bench Numbering Press Is Motorized

Designated as the Model 137, a motorized bench numbering press which is designed for the numbering, marking, and stamping of name plates, brass, aluminum, and plastic objects has been announced by Numberall Stamp & Tool Co., Huguenot Park,

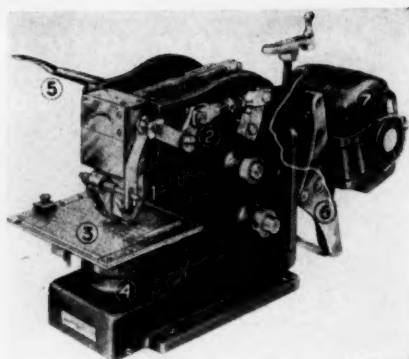
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T-NUT & STUD SETS
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STAR TYPE HAND KNOBS
HEXAGON TYPE HAND KNOBS
KNURLED HEAD SCREWS

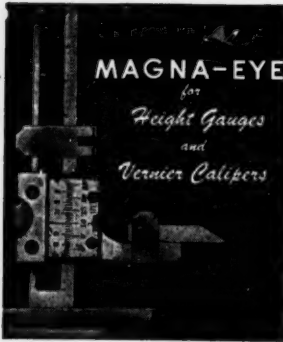
Northwestern
119 HOLLIER AVE., DAYTON 3, OHIO



Numberall Model 137 Motorized Bench Numbering Press

Staten Island 12, N. Y. The press, as illustrated herewith, includes (1) automatic numbering arrangement (extra); (2) tripping attachment for operating automatic numbering head (extra); (3) adjustable table (extra); (4) knurled adjusting nut for raising table to regulate depth of impression; (5) operating lever; (6) adjustable base for motor; and (7) ¼-h.p. motor (larger motor extra). With the motor attached, the press occupies a bench space measuring 22 inches deep x 9½ inches wide x 11½ inches high. The throat depth of the machine is 2¼ inches, and clearance between the ram and the table when adjusted down is 3½ inches. The table has a vertical adjustment of 2 inches.

MAGNA-EYE
for
Height Gauges
and
Vernier Calipers



MAGNIFIES the "hard to read" vernier scales on calipers and height gages. No more eye strain, guess work or hit or miss setting and reading. LENS is finest quality optical glass, specially designed and ground for the purpose with utmost optical skill. 4X magnification shows lines true and correct. In daily use in plants of Westinghouse, General Electric, General Motors, Chrysler, Packard, Ford, Boeing Aircraft, Bendix Aviation and many others engaged in defense work.

Made in 3 sizes to fit Starrett, Brown & Sharpe, Lufkin Tools, and others of similar design. 5 No. 100 for 6" Vernier Calipers; 5 No. 200 for 10"-12" Height Gages, also 10"-18"-24" Vernier Calipers; 5 No. 300 for most popular type 18" and 24" Height Gages and for 36"-48" and 60" Calipers.

For Complete Information Write, Phone or Wire
STEBAR COMPANY
711 W. Lake St. Minneapolis 8, Minn

EISLER CAM MILLING
JIG BORING

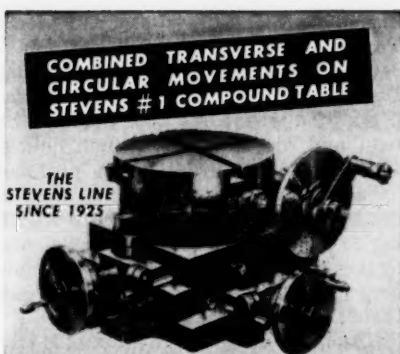
A SPECIALIZED CAM MILLING SERVICE...
JIG BORING... SPOT WELDING... CONTRACT PRODUCTION

...EXPERIMENTAL DEVELOPMENT

EISLER ENGINEERING CO., Inc.
734 So. 13th St. Newark 3, N. J.







Combines $3\frac{3}{4}$ " longitudinal and $3\frac{3}{4}$ " transverse movements with circular movement of $7\frac{1}{2}$ " Rotary Table. • Rotary Table and Compound Table can be used separately. • Larger No. 2 Compound Table also available.

WRITE FOR BULLETIN

Rotary Tables • Multiple Spindle Index Centers • Vises • Screw Head Slotters

The John B. Stevens Company

Main Street, Somersville, Conn., U. S. A.

Over 85% of the torque wrenches used in industry are

STURTEVANT TORQUE WRENCHES

Read by Sight, Sound or Feel

- Permanently Accurate
- Practically Indestructible
- Faster—Easier to use
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- All Capacities

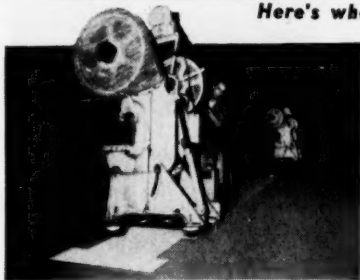
in inch ounces
...inch pounds
...foot pounds
All sizes from
0-4000 ft. lbs.

Every manufacturer, design and production man should have this valuable data. Sent upon request.

PA **STURTEVANT CO.**
ADDISON QUALITY LINDEN

Production line is **MOVED 200 feet** **AND PUT IN OPERATION IN 23 MINUTES**

Here's what happened in a recent demonstration...



Write TODAY for your free copy of "LOOK — NO LAGGING!" and learn what the new Leveling Barrymounts can mean in profits to YOU.

The Barry Corporation
784 Pleasant Street
Watertown 72, Mass.

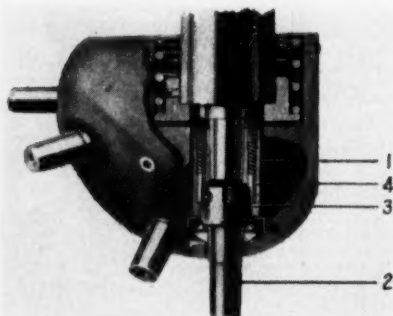
A production line of eight punch presses was moved to another location in a plant. The machines were set down, leveled, connected to air and electrical lines, and tools and dies inserted. All eight machines were producing parts in an elapsed time of 23 minutes. The new Leveling Barrymounts made this possible, because Barrymounted machines do not have to be shimmed and lagged to the floor. *The machines will not walk.*

This mobility increases profits because:

- Production lines can be quickly rearranged to improve work flow, or to meet product changes.
- Machines can be quickly moved to departments where they are needed.
- Machines can be quickly moved to central tool rooms for re-tooling or repair.
- Valuable floor space can be freed for production by moving idle machines out of the way.
- Inevitable mistakes in initial plant layout can easily be corrected.

Positive Drive Increases Capacity of Drill Turret

Howe & Fant, Inc., 540 Flaxhill Rd., South Norwalk, Conn., has announced



Howe & Fant Model E "Lign-o-matic" Drill Turret incorporating "Flying Dutchman" Positive Drive

the "Flying Dutchman" Positive Drive which is said to greatly increase the

capacity of its "Lign-o-matic" Drill Turret. A standard feature of the Model E Lign-o-matic Turret, the Flying Dutchman Drive, it is claimed, makes it possible to use any tool that can be held and driven by a 1/2-inch chuck, thus making it practical to perform operations well in excess of 1/2 inch in diameter in hard materials. According to the manufacturer, the efficiency of the drive is constant no matter how heavy the torque or how light the end thrust.

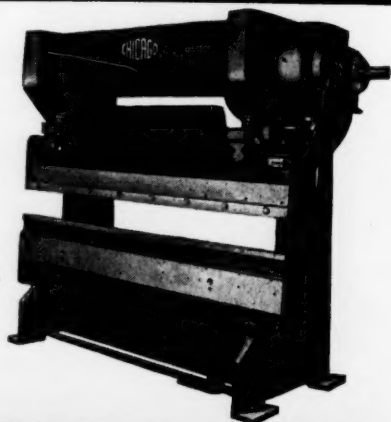
The basic design of the Model E turret is illustrated herewith. The driver (1) and turret spindle (2) automatically disengage during the last 3/4 inch of upward quill movement. The operator then indexes the turret in either direction to any desired station without stopping the motor. When the quill is lowered, the driver automatically engages the selected turret spindle. Mating tapers (3) automatically align the turret spindle for maximum

STEEL PRESS BRAKES

43 Standard Sizes

Readily adapted for a wide variety of bending, forming, drawing, notching, blanking, punching, embossing, etc.

DIES Complete Line of Induction Hardened Dies for All Makes and Sizes of PRESS BRAKES.



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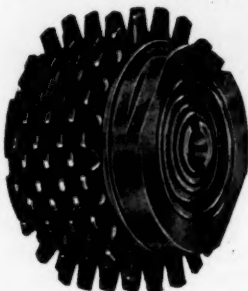
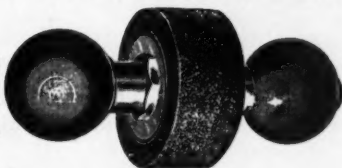
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HANCHETT METCALF WHEEL DRESSERS

FAST CUTTING ACTION

Balanced . . . Free Running . . . High Speed
Crushing and Wheel Forming Action . . .
For SHARP, CLEAN, OPEN WHEEL FACES



MODEL 1943 CC ASSEMBLY

STEEL CUTTERS
For Surface
Grinders, etc.

Complete
Assembly \$ 7.50
Extra Wheel \$1.35

Made by the World's Largest Manufacturers of

**SAW SHARPENING and
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MM-112

PORTLAND 4, ORE.

Six Sizes
Available

All Have
POWER
Feed for
Facing!



WRITE
for Complete Details

**THERE'S A FASTER
AND BETTER WAY
to Bore and Face**

• A Boring Head
that Won't Face
is Not Complete

Re-designed
Many New
Features



Model "D"

CHANDLER TOOL COMPANY
Muncie, Indiana

Chandler

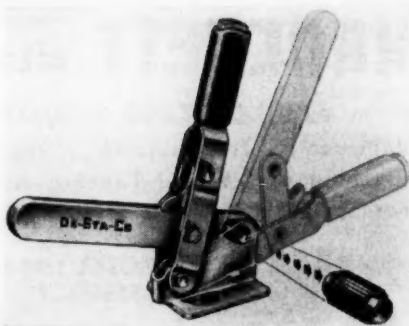
COMBINED
BORING
& FACING
TOOL HEADS

Duplex

accuracy. Simultaneously, two spring-loaded pins, or dutchmen (4), automatically engages slots in the turret spindle, providing maximum power.

Improved Toggle Clamp Features Hardened Serrated Bushing

Detroit Stamping Co., 349 Midland Ave., Detroit 3, Mich., has announced



"De-Sta-Co" Improved Toggle Clamp with hardened serrated bushings

Micro Supreme
LAY-OUT AND IDENTIFICATION DYE



7 COLORS

For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheets, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for sample and circular on company letterhead.

MICHIGAN CHROME & CHEMICAL COMPANY
8615 Grinnell Ave. • Detroit 13, Mich.

that its Series 210, 220, 228, and 240 "De-Sta-Co" Toggle Clamps now feature an improved bushing which is said to offer longer life under repeated stress and volume operations in the range from 500 to 800-lb. pressures. The improved bushing runs the full length through the clamp bars to provide more bearing surface and is hardened to resist wear. The bushing is serrated and locked in the clamp bars so that it will not turn and work loose. According to the manufacturer, the hard-bushed clamp minimizes replacements and provides continuous smooth, accurate snap action even under the heaviest production conditions. The improved clamp also incorporates a "wrap around" construction which strengthens the base.

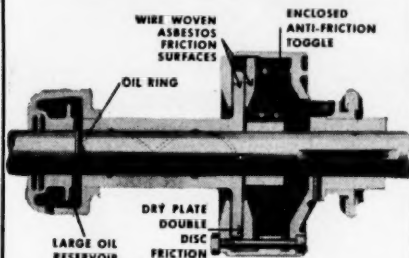
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PATENTED CUTTING OFF TOOL HOLDERS
PATENTED CUTTING OFF BLADES

ONLY the PATENTED construction of LUERS cutting off BLADES permits normal expansion of bursting chips — MEANS MAXIMUM CUTTING EFFICIENCY.

Manufactured by
J. MILTON LUERS, 12 Pine Street, Mt. Clemens, Mich.
Produced under License Issued by John Milton Luers Patents Inc.

FAST ACTING--POSITIVE CONTROL--LONG LIFE



This time-tested clutch provides maximum power transmission at lowest cost. For specifications and prices on wide range of sizes, write for Bulletin No. 25M. Brown Engineering Co., 120 N. Third St., Reading, Pa.

BROWN MULE PULL CLUTCHES

MARK IRON, STEEL and CARBIDES



THE
Echograph
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Original Electric Etcher, Thousands in Daily Use
Mark hardened parts, tools, dies, gages and fixtures of any ferrous metals including the hardest alloys and carbides—quickly—plainly. • Three sizes to meet all requirements.

• Write for circulars and prices.

BREWSTER-SQUIRES CO.

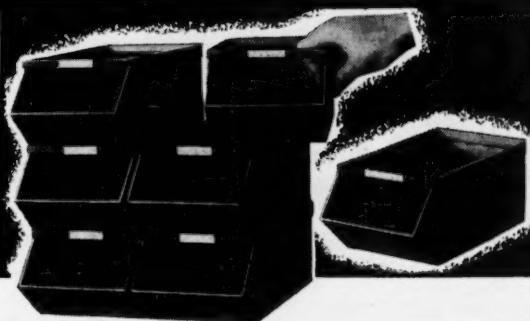
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You'll save time, space and labor handling parts and material when you use these patented STACKBINS.® STACKBINS keep parts instantly accessible—eliminate waste hand motions—stack compactly to form units of

exactly the right shape and capacity—make order filling or assembly work faster, easier, more efficient. Heavy steel, all-welded construction. Sizes from 3 1/2" x 6" x 3 1/4" to 15" x 24" x 11".

Manufactured and sold in Canada exclusively by Wickware-Stackbin, Ltd., Ottawa
Write Stackbin Corp., 1083 Main St., Pawtucket, R. I.

STACKBIN



SYSTEM

"Stacked and

Still Accessible"

Press Brake Features One-Piece Frame

Designated as the Model 800, an eight-foot press brake which features a one-piece frame, machined and normalized for relief of strain and to ensure accuracy, has been announced by Service Machine Co., 402 Miller St., Elizabeth, N. J. Having a capacity for bending up to 96 inch 16-gauge ma-



Semco Model 800 Press Brake

W.H.O.* SAYS:

*"Don't have FITS
over FASTENERS,
have fasteners
that fit."*



For the finest in
milled-from-the-bar
cap screws, set screws,
coupling bolts
and milled studs

**DON'T GET STUCK, STICK
TO THE ONES MADE BY**

** Wm. H. Ottumiller Co. YORK, PA.*

terial, the brake utilizes a 1½-h.p. 1,800-r.p.m. motor and provides from 16 to 40 strokes per minute. The maximum stroke is 3 inches, and the ram adjustment is 4½ inches. The distance from the floor to the bottom of the throat is 30½ inches. The press has an overall height of 79 inches and an overall depth of 44 inches. The depth at the base of the machine is 36 inches and the width at the machine base is 64 inches.

Full ball and roller bearing construction throughout is said to ensure long life, and all controls are in easy reach of the operator to provide for ease in handling.



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**SPUR • SPIRAL • WORM • BEVEL GEARS
GENERATED WITH PRECISION
ON MODERN EQUIPMENT**

Send **SAMPLE** or
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ATLANTIC GEAR WORKS, Inc.

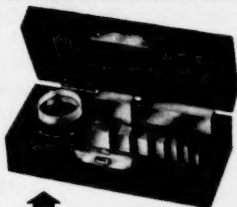
200-MM Lafayette Street • New York 12, N. Y.

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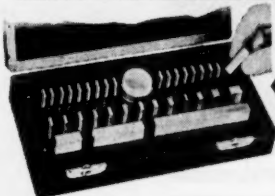
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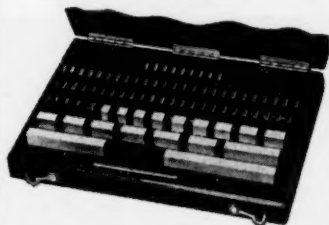


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OPTICAL PARALLEL **\$5.00**



34 Block Set \$125.00
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82 Block Set
\$275.00 Complete

This Set will supply the needs of any discriminating shop that must work to gage-block precision.

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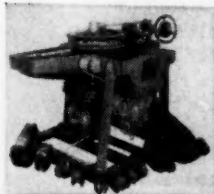
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**LINE OF COLD PIPE,
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ONE OF 10 HAND-OPERATED TYPES
bending cold pipe from 1/4"
to 6" I.P.S. inclusive



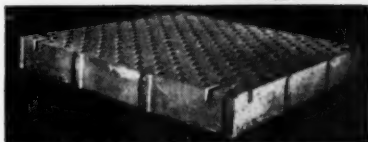
AMERICAN TYPE 2PBR

Designed for power application to our Type A-30 Hand Bender. Bends 1/2" to 2" Pipe at radii approx. 5 times pipe size, up to 180°. Complete, ready to run—no extras for standard machine. Min. radius bend—5 times pipe size. Max. radius bend—13". Complete with rolls for each pipe size. Standard motor equipment 2 H.P.

AMERICAN PIPE BENDING MACHINE CO., INC., 14 Furnace Street, Poultney, Vermont



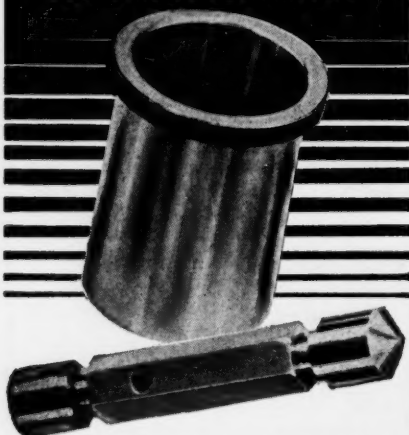
**Up to 2" —
Type A30**



COMBINATION BENDING TABLES

For hot or cold bends of various shapes, pipes, bars, etc. 5' sq.; 7' sq. (3 1/2' x 7' pairs) suitable for welding together. Other sizes or custom made to your specifications.

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ECONOMY PRECISION BUSHINGS AND GAGES WORK HAND IN HAND



- A.S.A. standard and special drill jig bushings.
- A.G.D. plug and ring gages, both new and chrome plate.
- Gages salvaged by hard chrome plating.

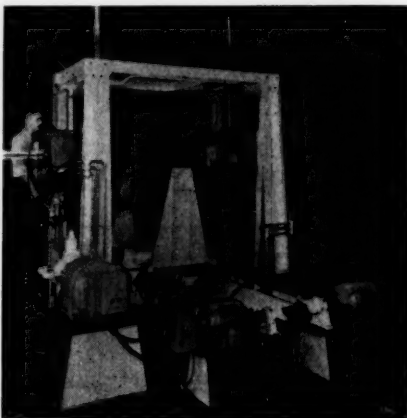
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Economy
TOOL & MACHINE CO.

1827 S. 68TH ST., MILWAUKEE 14, WIS.

Drilling Machine Speeds Multiple Hole Production

A semi-automatic hydraulically-controlled machine tool designed to speed drilling operations on medium size and large metal parts in both small lot and semi-mass production quantities has been announced by Walter P. Hill, Inc., 22183 Telegraph Rd., Detroit 19, Mich. Basically, the machine consists of two fabricated steel vertical structures, each supporting two columns and mounted opposite one another on a welded steel base.



Hill Opposed Spindle Drilling Machine

The machine table is traversed on ground steel ways on the base between the two structures. Motorized Hill power heads having integral hydraulic feeds are mounted on each vertical structure. The power heads, it is claimed, can feed individual drills or drill heads at varying speeds into opposite sides of the work at different levels. The heads are designed to resist 23,000 lb. unbalanced thrust loads.

The machine is available in a variety of sizes and models to meet individual requirements. Power is supplied by a Hill No. 2 power pack having a 5-h.p. motor and a 12-g.p.m. pump.

PRECISION CUTTER GRINDERS

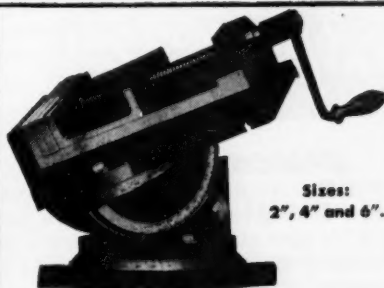


This is the Famous PREIS-PANTO Model CG Single-Lip Engraving and Routing Cutter Grinder. Surprisingly low in price because of the high-production basis of manufacture. • Easy to use because of simplicity of design and SURE to give true centers on your cutters.

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H. P. PREIS ENGRAVING MACHINE CO.
657 U. S. Route 22, Hillside, N. J.



Sizes:
2", 4" and 6".

MAKE SET-UPS FASTER--

Conserve valuable production time by using the fully universal, easily-operated MASTER MULTI-SWIVEL VISE for intricate, angular set-ups in your shop. Three swivels instantly set any compound angle. Used in shops throughout the world. Interchangeable platen optional.

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Punches Shaped from the SOLID with OTTMANN Punch Shaper



FEATURES:

1. No holder plates required.
2. Simple work mounting.
3. No re-setting — Work can be adjusted to any position of tool.
4. Forms shaped accurate. Parallel and true.
5. Minimum hand work.
6. Convenient, simple operation. Uses standard shaping tools.



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90 WEST ST.

NEW YORK 6, N. Y.

Two other Hill No. 1 power packs having 3-h.p. motors and 5-g.p.m. pumps furnish high pressure oil for hollow and gun drill type operations.

Measuring Instruments

P. I. T. Precision Instrument & Tool Corp., 1775 Broadway, New York 19, N. Y., is now marketing the Tesa line of measuring instruments, including a precision test indicator, the "Micro-



(Top) Tesa "Micromaster" Micrometer. (Lower left) Tesa "Unitest" Micrometer. (Lower right) Tesa Precision Test Indicator

**... for more than
1001 jobs**



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RECLINABLE POWER PRESSES



Ideal for general stamping work ... 4 to 100 tons capacity. Can recline to 40° with perfect safety.

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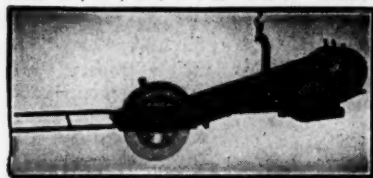
190 VANDERPOOL ST. NEWARK 5, N. J.

master" Micrometer, and the "Unitest" Micrometer. The Tesa Precision Test Indicator has a range of 0.06 inch and provides readings in 0.0005-inch increments. The instrument features a contact point which can be reversed 180 degrees, as well as a dull chrome-plated case and rotating bezel and dial. The indicator is available in both English and Metric systems.

The Micromaster, a precision micrometer, is said to provide direct readings in 0.0001 and 0.001 inch and has a range of from 0 to 1 inch. The instrument features internal miniature gears with a measuring spindle of unique design, carbide-tipped measuring surfaces, and a touch ratchet. The miniature gears actuate figures which appear in white on black in openings in the thimble.

MUMMERT-DIXON SWING FRAME GRINDERS

Sizes 12", 14", 16", 18", 20" and 24" wheels.



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Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from 3/16" to 3/4" U.S.S. Inexpensive — Last for years.



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New Haven 7, Conn.

The Unitest, designed for measuring large inner and outer diameters, has a measuring range of from 8 to 56 inches. The unit consists of a measuring element, comprising a micrometer screw with a range of 1 inch and a dial indicator reading to 0.001 inch; six extension rods in lengths of 1, 2, 4, 8, 12, and 20 inches; a support consisting of two parts; two adapters for measuring exterior dimensions; a calibration device; two wrenches for the

measuring element and the extensions; and a case for the complete set.

High-Density Material Has Specific Gravity of from 17.5 to 18.2

A high density material, designated as Heavy Metal, which is said to be practically pure tungsten with small amounts of nickel and copper added to aid machinability has been announced by Firth Sterling, Inc., 3113

Forbes St., Pittsburgh 30, Pa. According to the manufacturer, the metal has a specific gravity of from 17.5 to 18.2, which makes it up to 60 per cent heavier than lead, and has a tensile strength of a good quality steel. Typical applications of the metal are said to include counterweights, accelerometers, balancing weights, radium caskets, X-ray tube screens, electrical contacts and circuit breakers, gyroscope rotors, oil prospecting devices, vibration dampeners, flywheels, and anvils for hot extrusion and upsetting.

The metal can be supplied up to 20 inches in diameter x 18 inches high or in equivalent volume up to 3,500 pounds.



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Walker-Turner
Band Saws

16" Band Saw
WALKER-TURNER DIV.
Kearney & Trecker Corp.
Plainfield, New Jersey

Proof of Acceptance is that this manufacturer has joined the ranks of leading band saw manufacturers using CARTER Jiffy Tires as standard equipment because

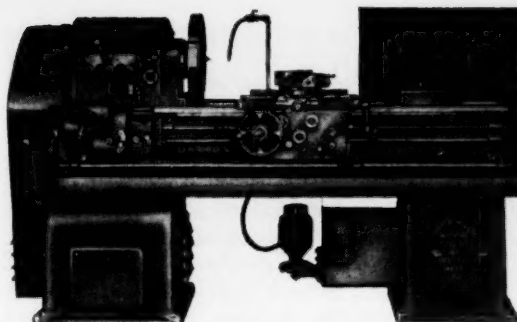
- Jiffy Tires can be changed in 10 minutes
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- Jiffy Tires are safe . . . won't throw at any speed



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PORTER McLEOD

16" Geared Head Quick Change
Screw Cutting Engine Lathes
6'-8'-10' Lengths

ONE OF THE FINEST ENGINE LATHES
MADE IN THE UNITED STATES TODAY

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Rigid and vibration-free, the Porter McLeod lathe is the product of a 60 year old company. More than 2500 are in service! All headstock gears are made of specially hardened chrome nickel steel. The spindle, also of chrome nickel steel, is forged and bored from solid stock, mounted front and rear on Timken roller bearings.

Many desirable features are incorporated in this precision lathe which is distributed exclusively by MOREY . . . Includes tailstock of cutaway pattern, taper gibbed compound rest. Lead screw has a chasing dial allowing operator to catch any thread at the beginning of each successive cut, while the feed rod is equipped with an adjustable automatic stop.

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PARTIAL SPECIFICATIONS

Distance between centers (6'): 36"; (8'):
60"; (10'): 84". Hole through spindle:
1 1/4". 12 spindle speeds, 23.6 to 1000
RPM. Anti-friction bearing headstock.
5 HP motor.

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NO. 150

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MAGNETIC BASE HOLDER**

FOR MOUNTING TEST INDICATORS UP TO 9" IN DIAMETER

Mounts to rods as small
as 3/4" in diameter, with
magnetic pull—125 lbs.

Think of that!

Indicator post now
firmly brazed
to pole piece to
insure solidity
—an ENCO
exclusive.

3-step universal rod in 3/16", 1/4" &
5/16" diameters, for all indicators.

✓ Offset clamp for lugback indicators.

✓ New fool-proof adaptor.

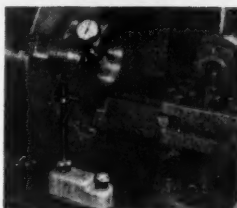
✓ Jack-type release & positioning screw.

✓ Ball swivel and stem of brass &
non-magnetic material.

Case, non-breakable
Tenite plastic, 1 1/4" x
4" x 1 3/4" high.



Pat.
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Shows Model No. 150 being
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engine lathe.

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See Us at Booth 527 at A.S.T.E. Show in Phila.
Order from your Enco stocking dealer or send order
with name of your mill supply dealer.

Comparator Gages Inside Diameters from $\frac{3}{8}$ to 6 Inches

Identified as the "Interapid," an internal comparator which has a capacity for gaging inside diameters from $\frac{3}{8}$ to 6 inches has been announced by The Portage Double Quick Tool Co., 1041 Sweitzer Ave., Akron 11, Ohio. The adjustment of the instrument is made by turning a knob in the center of the gage, and the initial setting is made with gage blocks, master gage

rings, or micrometers. A small locking lever is provided for retracting the arms, making it easy for the gaging tips to enter the work being checked. The comparative reading on the meter-type scale, which is graduated in 0.0005-inch increments, shows whether the holes are over or under size and by exactly how much. The measuring tips are at the extreme end of the arms, making it possible to check the diameter of very shallow counterbores.

The comparator is furnished with two sizes of centering arms which can be readily snapped

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Availability — 14 sizes in stock; $\frac{3}{8}$ " to 4" O.D., bored or unbored hubs.

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Portage "Interapid"
Internal Comparator

on and off. The centering arms are used in checking larger diameters and provide a three-point contact on one arm, thereby eliminating the need for "hunting" for the center of the bore. The instrument is supplied complete with the two centering arms, and is packed in a handy leather case.

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VERNIER CALIPER

IS NOW MADE OF
STAINLESS STEEL
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AND THE FOLLOWING
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- **SPECIALLY LONG VERNIER** to read thousandths
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- **3 GRADUATIONS** - 1/1600" - 1/125" - 1/10 mm in back

Request illustrated folder showing complete line of
**MAUSER Toolmakers Calipers, Height Gages, Bevel Pro-
tractors and Tool Stands.**

GEO. SCHERR CO., Inc.

200-MM Lafayette St., N.Y. 12



NEW NESTING TYPE

TOTE PANS

Sturdy 16 ga. metal.
20" long x 12" wide
x 6 1/4" deep. Drag
holes and handles at
both ends.

J. L. LUCAS & SON, INC.
Bridgeport 5, Conn.

NON-ROTATING DRILL STOP
for Precision Hole Depth Control



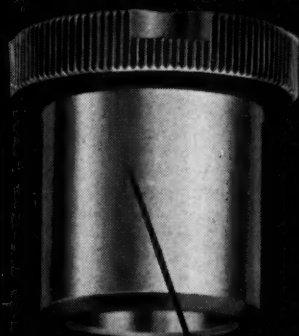
Now you can be certain of positive control of hole depth with the WOHLNIP Precision Drill Stop . . . which is Non-Rotating. Will not mar, mark or damage the face of the work, fixture or bushing. Completely automatic, the WOHLNIP Drill Stop reduces human errors, simplifies difficult jobs, lowers machining cost, increases production and accuracy, eliminating rejects. Used for drilling, center drilling, countersinking, boring, milling, routing, reaming. Used on drill presses, radial drills, milling machines, lathes, turret lathes, hand and automatic screw machines. Available as shown and with standard straight and taper shanks for any size needed.

(Patent Pending)

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DRILL BUSHINGS**
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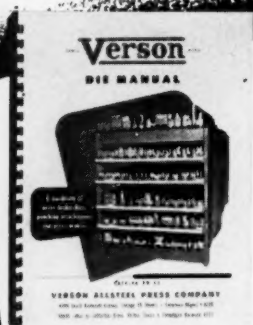
FRANKENMUTH 9, MICHIGAN

Instruments Are Designed for Quick Inspection

For quick inspection by unskilled personnel, George Scherr Co., 200-MM Lafayette St., New York 12, N. Y., has announced a roller thread pitch diameter comparator gage and a dial thread plug gage for checking internal threads. The roller thread pitch diameter comparator gage utilizes an indicator gage reading in 0.0001-inch increments and is set by means of a

master thread gage. A knurled thumbscrew at the bottom of the indicator housing sets the hand to zero. Two tolerance hands on the outside of the dial are set to the required tolerances, and the thread to be checked is inserted between two rollers. Variations in pitch diameter are said to be quickly read from the dial. According to the manufacturer, not only "go" and "no go" tolerances are determined, but also the position of the thread within the

tolerance field, detecting the right time when a threading tool must be renewed, and sorting the



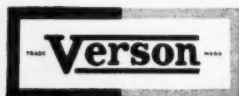
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ANSWERS
HUNDREDS OF
METAL FORMING
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Dm-53

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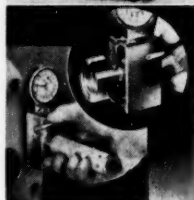
JUST off the press, the new enlarged Silver Anniversary edition of the Verson Die Manual contains 112 pages devoted to a pictorial presentation of Verson press brake dies and special tooling along with detailed text and tables on how to select dies for specific jobs, tonnages required, etc. To get your copy simply write on your company letterhead.



**VERSON ALLSTEEL
PRESS CO.**

9310 S. Kenwood Ave., Chicago 19, Ill.

So. Lamar at Ledbetter Dr., Dallas, Tex.



(Top) Scherr Roller Thread Pitch Diameter Comparator Gage.
(Bottom) Scherr Dial Thread Plug Gage

work into classes of accuracy.

The dial thread plug gage measures internal threads quickly by means of

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On tapping and reaming jobs, if you're interested in saving time in aligning the work with the spindle, change over to the Ziegler Tool Holder.

Here's a holder that eliminates the time-consuming work of making perfect set-ups. With the Ziegler, all that is necessary is to come within 1/32" of center on the radius (or 1/16" on the diameter) and the Ziegler automatically compensates for the inaccuracy in alignment.

Thousands have proved this to their own satisfaction over a long period of years. Why not try a Ziegler and see for yourself!



FLOATING HOLDER
for Taps and Reamers...

W. M. ZIEGLER TOOL CO.

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CATALOG** •

three interchangeable measuring jaws, the middle one of which is retractable between the other two. The jaws are first inserted in a ring gage and the indicator set to zero and the jaws then used on the work. Variations are said to be quickly observed on a dial which was preset to prescribed tolerances by two adjustable tolerance hands. The middle jaw retracts when the lever below the indicator is pressed downward. The measuring jaws are inserted into the bore and, upon release of the lever, engage the thread inside the bore. The instrument is available in three sizes for ranges of thread diameters measuring $\frac{3}{16}$ to 1 inch, $1\frac{1}{16}$ to $2\frac{1}{16}$ inches, and $2\frac{1}{2}$ to $4\frac{3}{4}$ inches.

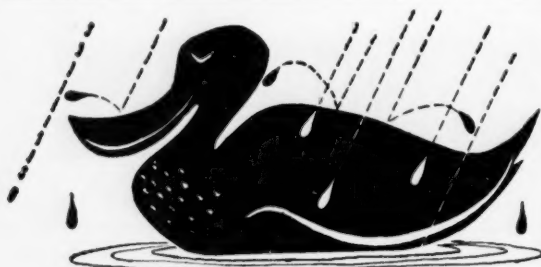
Rectangular Tool Bits Are Made of Carbon and Vanadium

The du Mont Corp., Greenfield, Mass., has announced the addition of a complete standard range of super



du Mont Super High Speed Rectangular Ground Tool Bits

high speed rectangular ground tool bits to its present line of square bits. The rectangular bits are made of blended and balanced carbon and vanadium which, it is claimed, produces fine grain structure. The bits are heat treated to obtain a high Rockwell (66 to 68 "C" scale) and ground to close tolerances without carburization.



HOW TO DUCK THE WELD-SPATTER PROBLEM

Use Protect-O-Metal and weld spatter wipes off as easily as water from a duck's back! With Protect-O-Metal you speed welding and save up to 85% of weld cleaning time and labor. Brush or spray P. O. M. in weld seam and on adjacent metal—weld—then brush off spatter in seconds. Just a little P. O. M. goes a long way too—costs less than 1/10c per foot of weld protected, saves up to three times its cost in time savings alone. Order a trial gallon (\$3.25) satisfaction guaranteed or invoice will be cancelled.

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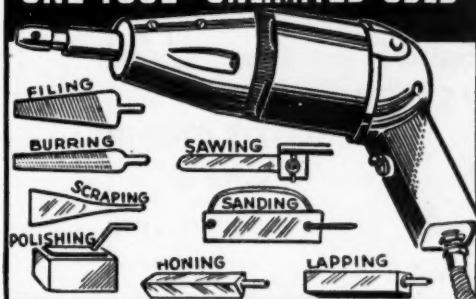
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Use these Handy PORTABLE ELECTRIC RECIPROCATING TOOLS for Greater Production, Better, More Uniform Work — All with less Operator Fatigue. Fixed strokes are $\frac{1}{8}$ " or $\frac{3}{8}$ " long. Operate on 110 Volts AC-DC. Deliver 1000 PUSH-PULL strokes per minute. Try one of these tools on your next job.

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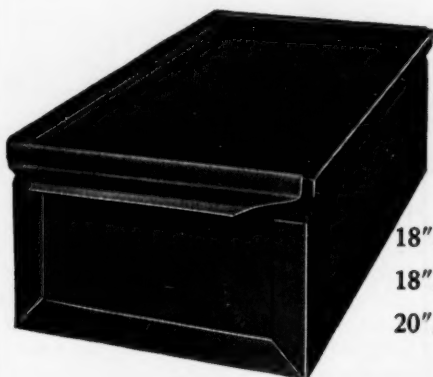
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Quality Handling & Storage Equipment



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#5 BROWN & SHARPE
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1 Self adjusting . . . Powerful springs keep the bearings and shaft chatter-free regardless of wear or temperature change.

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3 Fine finishes are assured . . . The spindle assembly is precision balanced on its own bearings. These ball bearings are the most accurate obtainable.

4 Completely interchangeable . . . This unit replaces the old bearing assembly on your present grinder.

5 Use your original pulley and wheel mount . . . No need to buy special attachments.

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The Whitnon
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217 High St. New Britain, Conn.

Metal Sawing Machine Has
6 x 6-Inch Capacity

Identified as the "Speedy-Cut," a metal sawing machine which has a 6 x 6-inch capacity and which is designed for general purpose use has been announced by Peerless Machine Co., 1600 Junction Ave., Racine, Wis. The machine utilizes a broad-shouldered U-type overarm which is accurately machined, and the saw blade is held rigidly by special flat steel blade holders.

Adjustable gibs on top and side



Peerless "Speedy-Cut" Metal Sawing Machine

of the saw frame guide compensate for wear. The machine features a trip switch which automatically stops the saw at the end of each cut, a centrifugal pump for dependable coolant flow, and massive vise jaws for holding work firmly. The rear vise jaw, it is claimed, can be set at the required angle, and the front movable jaw automatically adjusts itself to the work angle.

The machine also incorporates a compensating feeding mechanism which automatically adjusts itself to the size and shape of the workpiece. For fine adjustments for varying pres-

The "UTILITY"



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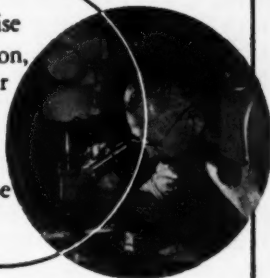
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1051 CHATEAU STREET, PITTSBURGH 33, PA.

Precise
hole location,
easy contour
inspection
with *new*
machine tool
microscope



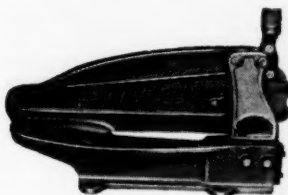
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Inside SLOTTER

Make cuts up to 8" inside edge of sheet. Sharp, clean burr-free cuts always assured. Cap. 16 ga. High strength aluminum alloy body; H.C.H.C. blades.



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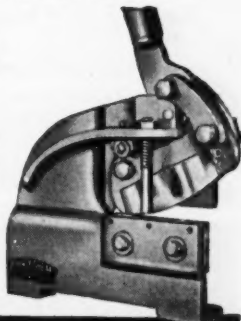
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tures, the sawing machine is provided with a feed adjusting handwheel and a pressure indicator and graduated scale which can quickly and easily be read by the operator. The machine is powered by a $\frac{3}{4}$ -h.p. electric motor.

Carbide-Tipped Gun Drill for Deep Hole Drilling

Available in solid high-speed body and oil tube body types, a carbide-



Whitman & Barnes Carbide-Tipped Gun Drills

tipped gun drill which is designed for drilling holes as deep as from 4 to above 250 times the diameter of the drill has been announced by Whitman & Barnes, Plymouth, Mich. The solid high-speed body type drill is used

when the hole is comparatively shallow. The oil tube type drill is used when the hole to be drilled is very deep. In both cases, oil under pressure is used to cool the cutting lip of the drill and force chips out of the hole.

According to the manufacturer, it is practical to revolve either the drill or the workpiece, and, in some instances, it is reasonable to revolve both. Oil can be forced through the end of the shank or the side of the drill, depending upon the machine in use. The drill can be used in vertical or horizontal positions, and application can be singular or multiple, depending upon the setup in the machine.



Just pull out the shim stock as needed and snip off! Always ready for use — space saving — no waste. Free dispenser holds four rolls of brass or steel shim stock in sizes you want, .001" to .010", six inches wide and 100" long.

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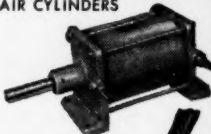
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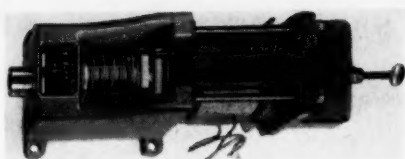
4114 NO. KNOX AVE., Dept. AA-24, CHICAGO 41, ILL.

February, 1954

MODERN MACHINE SHOP 317

Electric Impact Hammer Is Suitable for Fixed Single-Purpose Applications

Designated as the "Electropunch, Jr.," an electric impact hammer which is said to be suitable for fixed single-purpose applications where controlled impacts up to 3,500 lb. are required has been announced by Black & Webster, Inc., Dept. 80, 445 Watertown St., Newton 58, Mass. According to the manufacturer, the hammer is applica-



Black & Webster "Electropunch, Jr." Electric Impact Hammer

ble to automatic, semi-automatic, and manual operations where speed and

high production rates are required and is capable of staking, riveting, marking, cutting, blanking, forming, and drawing a wide variety of materials. The unit combines a solenoid with a mounted ram which is said to deliver accurate and controlled blows. A high temperature silicone - insulated coil in the solenoid enables the unit to operate continuously at the rate of more than 100 blows per minute.

The guided ram, or spindle, is hardened and ground and reciprocates in a honed bronze bearing. The spindle has a return spring. The hammer is available in three models; namely, the Model JB with an impact of

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Center-Mike measures any center to center distance within range—regardless of hole sizes—in thirty seconds without set-up! Yes, this precision center mike **COSTS YOU NOTHING!** It pays for itself in a few weeks, and then goes on paying you a profit each time it's used! Save time—Save money—Your inspection department is not complete without the CENTER-MIKE.

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• Automatic Torque Control, One Minute to Adjust, Prevents Tap Breakage, Operator Need Not Be Skilled.

• WIDE RANGE TAP CAPACITY.

No. 1A FRICTION DRIVE TAPPER — capacity No. 2-56 to $\frac{3}{8}$ " in Steel — $\frac{1}{2}$ " in Aluminum.

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No. 3A POSITIVE TAPPER — capacity $\frac{1}{2}$ " to $1\frac{1}{4}$ " in Steel — $\frac{1}{2}$ " to $\frac{3}{4}$ " Pipe Taps.

No. 4A TAPPER — capacity $\frac{3}{4}$ " to 2" in Steel including Pipe Taps.

• PRODUCTION THREADERS with Round Split . . . Button . . . Acorn Dies.

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Division of Thomson Industries, Inc.

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1,500 lb., the Model JH with an impact of 2,000 lb., and the Model JS with an impact of 3,500 pounds.

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Three series of air tools, designated as the No. 3 Series, No. 35 Series, and No. 5 Series, which cover applications ranging from 1/4-inch drilling to 3/4-inch bolt size nut setting have been



Diameter up to .125" — Length up to 1"

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Taper Tolerance .0001" In Length Of Pin

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(Top) Thor No. 5 Series Nut Setter. (Bottom) Thor No. 3 Series Drill

announced by Thor Power Tool Co., Aurora, Ill. In the No. 3 Series, one basic No. 3 air motor powers four straight drills (which are convertible to direct drive nut setters), four right-angle drills, and four right-angle nut setters. Speeds range from 3,400 to 800 r.p.m. with capacities of 3/4, 5/8, and 3/4 inch.

The No. 35 Series features three grip-handle drills in speeds of 1,150, 800, and 550 r.p.m. and capacities of 3/8 and 7/16 inch. The drills are convertible to direct drive nut setters of 5/16-inch thread size capacity. In the No. 5 Series, right-angle nut setters are offered in speeds of 600, 450, 300, and 225 r.p.m. for setting nuts of 1/2, 5/8, and 3/4-inch thread size.



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For—milling, slitting and gang-saw setups, shim-
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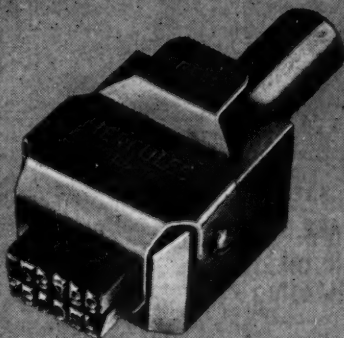
HERCULES DOUBLE-LINE PRESS HOLDER
 permits instant interchanging of type!

FIRST to permit two lines of type to be changed by thumb pressure on single holding clip.

FIRST in extra quality of steel and strictly engraved "shoulder style" type.

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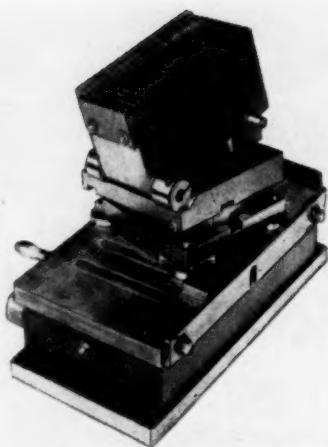
The
ACROMARK
 Company



9 MORRELL STREET
 ELIZABETH 4, NEW JERSEY

Triple Compound Sine Plate Has Permanent Magnetic Chuck

Designated as the "Multi-Sine," a triple compound sine plate which has a permanent magnetic chuck, thus allowing angular adjustments in three planes and permitting the possibility of obtaining every conceivable combination of angles, has been announced by American Standard Co., Plants-



American "Multi-Sine" Triple Compound Sine Plate

AT LAST!

A Low-Priced Dial Type Indicator

Has 2 contacts 1/32" threaded within 1/8". Double Faced. Reads front and back. Two Crystals. Double faced dial indicator complete with plated holder including 1/32" and 1/8" contacts —

Black Pentrate \$6.95
Satin Chrome 7.95
1/32" Contact, 1/2" long extension75

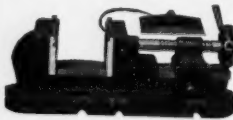
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J. E. MARTIN MACHINE CO.

SPRINGFIELD

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ville, Conn. According to the manufacturer, the base of the unit incorporates four rolls of equal size on all four corners, making the horizontal angular setting accessible at any position. All rolls are located 4 inches apart; thus, sine of angle $\times 4$ is used for horizontal setting and sine $\times 4 + 0.300$ inch is used for the two other settings. The magnetic chuck measures $2\frac{7}{8} \times 5\frac{3}{8}$ inches. The overall height of the sine plate is 5 inches. The unit can be supplied hardened and ground to a 0.0004-inch accuracy or hardened, ground, and lapped to a 0.0002-inch accuracy.

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MEASURE TO 1/10,000th

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0-1" Size
with LOCK NUT and RATCHET and 10th vernier as shown

\$13.25

This tool with TUNGSTEN CARBIDE tipped anvils **\$15.75**

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- Wider Range . . . 1 Tapper Handles No. 0 to $\frac{3}{4}$ " Taps
- Automatic Tap Protection
- Furnished to fit any Drill Press

Commander — "The Tapper That Thinks For Its Operator," has the adjustable full range torque control that instantly stops any tap when it becomes dull, loaded, strikes a hard spot or bottoms in blind hole tapping. Assures maximum tap protection, higher production, even with inexperienced operators.

Your nearby Commander Distributor can give you a demonstration in your own plant. Write for his name and a copy of the NEW Commander Full Line Catalog No. 851.

COMMANDER MFG. CO.

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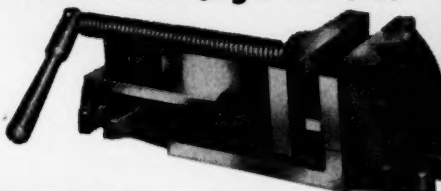
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Any operator
does precision
tapping with
a *Commander*
TAPPER

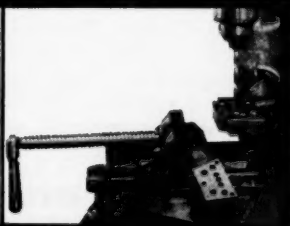
Product of *Commander* . . . Builder of the *Multi-Drill*

A Hundred Jigs In One



- ★ Quick action design — for speed.
- ★ Heavy steel base plate — for rigidity.
- ★ Screw and nut hardened steel — for long life.
- ★ Standardized holes in jaws — for attaching interchangeable jaw plates and fixtures.
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MACHINE
COMPANY**
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Tooling Costs

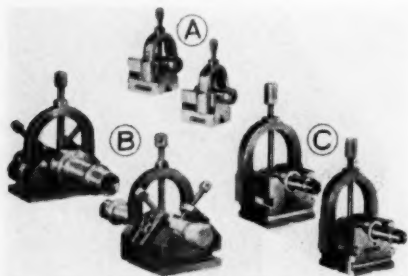
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Lift . . . Slide . . . Lock . . . that's all it takes with the fast-acting positive locking SPEED VISE. Drill jigs and other fixtures are simpler, cheaper and smaller when made for use in a SPEED VISE. Instead of a cumbersome and expensive box jig, with a SPEED VISE it is only necessary to make a simple jaw plate to fit the part being machined and to hold drill bushings, etc.

V-Blocks Are Furnished in Matched Pairs

Designated as "Uni-V-Blocks," a matched pair of V-blocks which are



(A) Precision Model 1250 "Uni-V-Blocks," (B) Precision Model 3000 "Uni-V-Blocks," (C) Precision Model 5000 "Uni-V-Blocks"

said to be square, parallel, and concentric to each other to an unusual degree of accuracy has been announced by Precision Tool & Mfg. Co. of Illi-

nois, 1305 S. Laramie Ave., Cicero 50, Ill. The V-blocks are available in three models; namely, Model 1250, Model 3000, and Model 5000. The Model 1250 block measures $1\frac{1}{4} \times 1\frac{1}{4} \times 1\frac{5}{8}$ inch, is made of high grade tool steel, and is heat treated to 58 to 60 Rockwell C scale. The block will nest up to a 1-inch diameter. Two heat-treated and hardened hoop clamps are furnished with each pair. The Model 3000 block measures $2\text{-}7/32 \times 3\frac{3}{4} \times 2\frac{5}{8}$ inch, will nest up to a $2\frac{1}{2}$ -inch diameter in the vee, and is heat treated and drawn to obtain a hardness of from 58 to 60 Rockwell C scale. Two hold-down cleats are furnished with each block.

The Model 5000 block measures $4\frac{3}{8} \times 5\frac{1}{8} \times 5\frac{3}{8}$ inches, will nest up to a $4\frac{1}{4}$ -inch diameter, and is heat treated and drawn to obtain a hardness of from 58 to 60 Rockwell C scale. Rigid clamps are provided for holding the workpiece in the vee.

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even better with

79E BOND

**the new miracle
grinding wheel bond**

Greatest selection of sizes and shapes for every application. Best of all, deliveries are good . . . ready when you need them.

Try Chicago Mounted Wheels—bonded with 79E Bond—and you'll never buy any other! This tough new grinding wheel bond, exclusive with Chicago Wheel, has taken the industrial world virtually by storm, doing a better grinding job faster.

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Because:

1. Unlimited life within borders of permissible loads.
2. No creeping, initial settling or gradual fatigue.
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10. Most Spring sizes available from stock.

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6" Universal Dividing Head



with
DIRECT INDEXING

Optional SWIVEL BASE converts a conventional dividing head into a universal work head or rotary table. Change-over is accomplished in seconds without tools or wrenches.

Also available in 10" - 12" sizes and in 10" - 12" spiral drive.

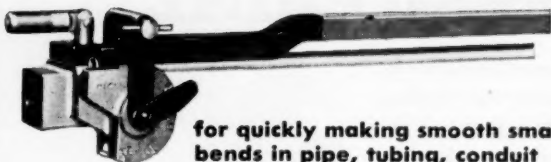
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CARROLL DIVIDING HEAD CO.

3525 Cardiff Ave.

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GREENLEE HAND BENDER



for quickly making smooth small-radius bends in pipe, tubing, conduit

Forming small-radius bends without flattening or kinks is simple, speedy work with a GREENLEE Hand Bender. Ideal in the shop for pipe and tubing installations on machines... especially designed to form neat bends for sharp corners, nooks and other close quarters. Various models and sizes for steel, copper, brass and aluminum tubing or pipe, rigid and thin-wall conduit



GET FREE FOLDER E-207 AND BOOKLET E-201. Complete facts and prices on the Greenlee Bender line. Write Greenlee Tool Company, — Herbert Avenue, Rockford, Illinois.



Carbide-Tipped Twist Drill Provides Good Chip Clearance

Super Tool Co., 21650 Hoover Rd.,
Detroit 13, Mich., has announced a

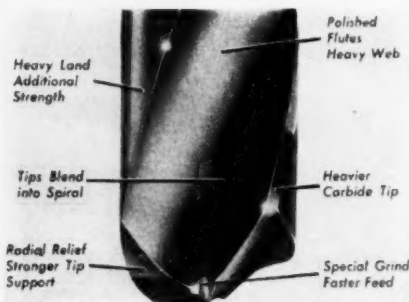


Illustration pointing out construction features
of Super Carbide-Tipped Twist Drill

carbide-tipped twist drill in which the spiral on the face of the carbide tip is accurately blended into that of the drill for good chip clearance and mini-

mum strain. Also, the end of the drill is radially relieved to provide more steel behind the tip and maximum support. The drill has an extra-heavy carbide tip, as well as an extra-heavy web strength and a heavy land to preserve its diameter and serve as a pilot. The entire body of the drill is made of high speed steel.

Machine Chamfers Internal Spline and Gear Teeth

Designated as the Model 388, an internal burring machine which is designed for chamfering the involute contour of internal spline and gear teeth, either straight or helical around their full form, has been announced by The Sheffield Corp., Dayton 1, Ohio. The production rate of the machine depends upon the diameter and pitch of the gear teeth but is said to be up to and including 300 teeth per minute. The machine, it is claimed, is a uni-

Nicholson Air-Gas-Steam Traps NEVER NEED PRIME

Nicholson weight-operated traps, under no condition, leak medium from a power transmission system. This prevents the costly loss of air, gas or steam occurring when inverted bucket traps lose their prime. Under such conditions Nicholson traps hold tight because they do not depend on buoyancy of float to raise valve. 3 types; pressures to 1500 lbs.

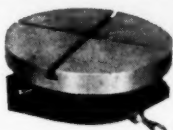
136 Oregon St., Wilkes-Barre, Pa.



W. H. NICHOLSON & CO.
TRAPS · VALVES · FLOATS

TROYKE ROTARY TABLES

- Saves fixtures and time consuming setups.
- Saves time in circular positioning.



CAM LOCKING TYPE ROTARY TABLES

Three sizes: 12", 15", 18"

This model is intended for die sinking, bench work, and assembly of machine units when quick rotation and positioning are required.



STANDARD MODELS WORM WHEEL OPERATED ROTARY TABLES

Five sizes: 9", 12", 15", 21"

For die sinking, jig boring, cam milling. Indispensable in wood and metal pattern shops.



HEAVY DUTY MODELS WORM WHEEL OPERATED ROTARY TABLES

Three sizes: 18", 21", 25"

These larger, heavy duty models are used for jig work, planer jobs, and on horizontal boring mills.

DIVIDING ATTACHMENTS or DRILLING ATTACHMENTS can be furnished.

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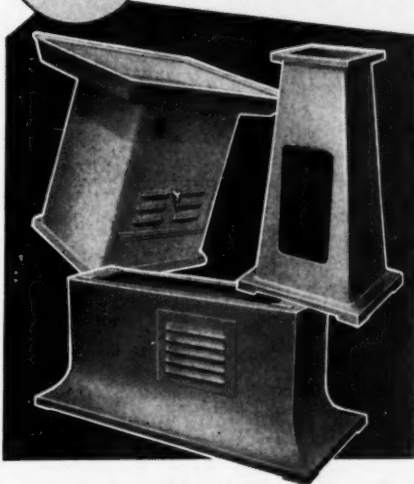
TROYKE MFG. CO.

CINCINNATI 9, OHIO

February, 1954

machine bases

**FABRICATED TO YOUR
SPECIFICATIONS**



Fabricated Machine Bases lend themselves to efficient, modern design and utilize the economies of welded steel. By reappraising your products for steel, you can initiate many cost-cutting opportunities in manufacturing because:

STEEL DESIGN USES LESS MATERIAL—Steel is three times stronger than iron and fabricated units have all the inherent strength and toughness to withstand shock, strain and vibration.

MANUFACTURING COSTS ARE LESS—Fabricated Bases adapt themselves to design, improvements and changes at any time with the minimum of cost.

Send blueprints to Littleford. See how Fabricated Bases can save you money.



LITTLEFORD

LITTLEFORD BROS., INC.

433 E. Pearl Street, Cincinnati 2, Ohio

MODERN MACHINE SHOP 327

Facts about Magnetic Separation and how it Pays Off



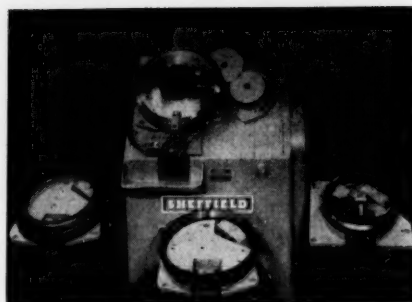
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Here is full information on how the FRANTZ Permanent Magnet FERROFILTER removes ferrous particles and chips from lubricating and hydraulic oils and coolants. It tells how you can protect surfaces subject to wear . . . get better finishes and more production . . . save wear on tools. The bulletin also gives operating and installation data and information on sizes and capacities.

S. G. FRANTZ CO., Inc.

P. O. Box 1138

Trenton 6, N. J.



Sheffield Model 388 Internal Burring Machine

versal tool and can be changed over from one type of gear to another in less than 30 minutes.

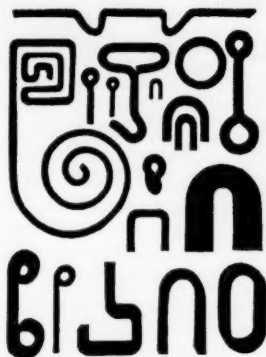
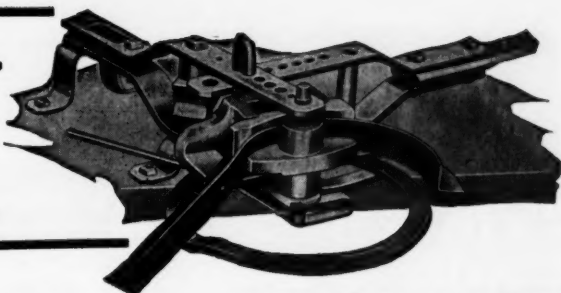
Air Pencil Die Grinder Has Speed of 40,000 R.P.M.

Designated as the D-03, an air pencil die grinder which is said to operate at a speed of 40,000 r.p.m. has been announced by The Rotor Tool Co., Cleveland 23, Ohio. The grinder measures 5 3/4 inches long x 1 inch in diameter and weighs 13 oz. Designed to accommodate a 1/8 or 1/4-inch collet, the unit utilizes a three-bladed air motor, select ball bearings, a one-piece spindle, and a sliding sleeve throttle. A tool post holder is available, as well as steel heads without a throttle.

Rotor D-03 Air Pencil Die Grinder in use



ONE MAN...
bends 2" x 2" x 3/16"
Angle Iron
EASILY ...



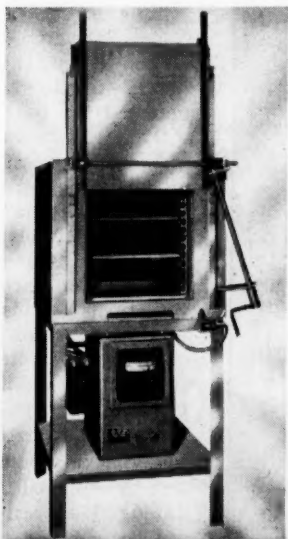
**with the . . . HYDRAULIC POWERED
HOSSFELD UNIVERSAL IRON BENDER**

Hydraulic unit provides plenty of bending power at your fingertips for smooth effortless bending. Reduce hand labor . . . speed up work . . . improve quality of bends. Fast and accurate, the Hossfeld Hydraulic Bender handles rounds, flats, pipe and angle iron. Forms rings, coils, "U" and "S" bends, eyebolts, spring eyes, etc. Gain higher production with lower labor costs.

Write NOW . . . for Complete Details!

HOSSFELD MANUFACTURING COMPANY

402 WEST 3RD ST. • MINONA, MINNESOTA



**BLUE M AUTOMATIC
Recirculating Air Draw
ELECTRIC FURNACE**

check these extra value features

Wide range...300° to 1350° F...covers work usually needing several units. New electronic automatic controls, plus wattage selector switch and alloy interior combine to give you maximum efficiency.

Safer...opening the door automatically shuts off air flow and door locks itself wherever stopped. Blue M's stepped-up air flow rate stops air anemia at high temperatures.

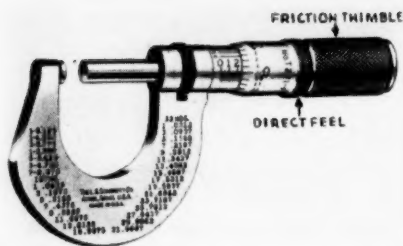
Working Chamber 12" W x 14" D x 12" H . . . \$924.00
Working Chamber 15" W x 24" D x 18" H . . . 1395.00



Blue M Electric Co., 306 W. 69th Street, Chicago, Illinois

Micrometer Features Built-In Friction Control Mechanism and Direct Feel

A micrometer caliper which features both friction control and direct feel and which is designed for easy one-hand use has been announced by The L. S. Starrett Co., Athol, Mass. An improved friction control mechanism is built right into the upper portion of the thimble. With the friction thimble feature, which is controlled by



Starrett No. 231-F Friction Thimble Micrometer

PS AIR SAVER

leak proof

AIR VALVE

50975
(Valve Alone)
\$13.20

50801
Complete Assembly includes Valve, Housing Rods, Operating Cam
\$16.50

—For Maximum Machine Tool Efficiency—give you perfect, leak-proof air power control every split-second of machine tool operation. Ideally suited where air is used for cleaning, drying, cooling, positioning or ejecting. Recommended around punch presses, die casting machinery, drill presses, in reaming, broaching and many other operations. Provide ample air volume for operation of single or multiple jets. Mount in any position, to operate at any angle unaffected by vibration.

Immediate Delivery

Palmer Shile Co.

16022 FULLERTON AVE., DETROIT 27, MICH.

Item D-38 (Box)

Item C-481 (Stand)

Sloped Bottom BOX and STAND

Item B-768

Heavy Duty DIE TRUCK

SHOVEL TRUCK

Item B-399-M

the outer portion of the thimble, the spindle will not advance after the correct contact pressure is applied, ensuring uniformly accurate readings on all measurements. The lower or "direct feel" section of the thimble is integral with the spindle. Both sections of the thimble are knurled for ease in adjusting.

Other features of the instrument include no-glare "Satin Chrome" finish on thimble, sleeve, and frame to eliminate glare and resist stains and corrosion; one-piece spindle for rigid internal construction; replaceable, adjustable sleeve which can be replaced if damaged or worn; quick-reading figures; and tapered frame. The fric-

**DOES IT BETTER
DOES IT FASTER**

SIMPLEX-M ABRASIVE BAND GRINDER



The precision of a machine tool plus the durability of a workhorse. Complete with 1/2 H.P. Heavy Duty Motor and automatic band tension control. Nothing like it for finishing metals, plastics, wood, fibre, etc.

**OTHER STYLES AND SIZES IN NEW
MANUAL ON FINISHING—WRITE TODAY**

WALLS SALES CORP.

333 Nassau Avenue, Brooklyn 22, N. Y.

Standardize on

hall COLLET CHUCKS

**for
SPEED,
ACCURACY,
ECONOMY**



Automatic adjustment speeds up production in multiple operations with push-out type HALL COLLET CHUCKS. Full spindle capacity or over. Tremendous grip over or under stock size to .007—without adjustments. All grip...no slip. No bearings...no heat or lost power. Instant release without stopping lathe.

SATISFACTION GUARANTEED!

Made in Two Sizes to Fit Your Requirements:

Model A...1" (max. capacity 1-1/16")

Model B...2" (max. capacity 2-1/16")

Round, square or hexagon collets, plain or serrated
No. 3 Collet Pads Now Available

Write today for illustrated catalog and price list—Dept. B-2.

HALL MANUFACTURING COMPANY

427 TULAROSA DRIVE, LOS ANGELES 26, CALIFORNIA

Stop and Shop at Rivett's production corner

DRAW-IN COLLETS

Stocked in all standard styles...checked 25 times against master gauges...guaranteed to run "dead true" at collet mouth. Write for Bulletin 100.



THREAD TOOL

No operator skill required to produce perfect threads. Duplicates threads without gauging. Mounts on any screw-cutting lathe. Write for Bulletin 110.



LOCKJAW

Set-ups stay put! Grips both downwards and sideways...eliminates bolting and clamping. Used on all table top machine tools. 2 sizes available. Write for Bulletin 140-A.



RIVETT LATHE & GRINDER, Inc.

Dept. MMSA-2

Brighton 35, Boston, Massachusetts



Beauty TO LOOK AT
... BEAUTY IN
Performance

Hollow-ground and bright all over, Reltool End Mills are not only the best looking end mills you ever saw ... they're proven in performance and cutting efficiency. In addition, they're designed for easy chip flow and 10% to 35% longer cutting life. Next time you need End Mills, re-tool with Reltool!

The RELTOOL Line Includes: Combined Drill and Countersinks • Cut-off Blades • Die Sinking Cutters • Dovetail Cutters • End Mills • End Mill Holders • Hollow Mills • Key Seat Cutters • Lathe Centers • Lathe Mandrels • Machine Countersinks • Metal Slitting Saws • Milling Cutters — all types • Screw Slotters • Tool Bits • Specials.

Write for Reltool's net price catalog 53.



4540 W. BURNHAM ST. • MILWAUKEE 46, WIS.

tion thimble feature is available on Starrett No. 230-F and No. 231-F Micrometers, as well as on many other sizes and styles.

Coolant Cooler for High Production Machining Operations

A coolant cooler for high production machining operations on hones, lappers, surface grinders, thread grinders, and other applications requiring accurate control over coolant temperature



Webber Coolant Cooler

has been announced by Webber Mfg. Co., Inc., Dept. 294, 2740 Madison Ave., Indianapolis 3, Ind. Designed for normal installation in the coolant line between the pump and the nozzles, the cooler is said to provide for accurate machining, close working tolerances, unusual surface finishes, and long tool life. Minimum change in the size of metal being worked is claimed to eliminate out-of-round, out-of-size, and distorted or poor finishes.

The Webber Coolant Cooler is available in a variety of capacities and sizes for almost all coolant operations.

When You Specify **"CHICAGO"**
THREADED PRODUCTS
You Get **FASTER SERVICE**

Our more complete stocks mean "at once" shipments of quality fasteners when you need them—no production delays—no maintenance "shut downs."

"Chicago" quality threaded products include: Hexagon Head Cap Screws, Bright and Heat Treated Grade 5 • Square Head and Headless Set Screws • Hexagon Nuts • Hexagon Castellated Nuts • Socket Head Cap Screws • Socket Set Screws • Socket Pipe Plugs.

To Speed deliveries to you, order "Chicago" products from your nearest Industrial Supply Distributor. He carries a complete stock of our products—he will gladly furnish you with samples—his familiarity with your local field conditions enables him to fill your needs promptly and correctly.

The **CHICAGO SCREW COMPANY**

2505 WASHINGTON BOULEVARD
 BELLWOOD, ILLINOIS

Labor Saving **Production CHUCK**

Will pay for itself in 60 to 90 days

On turrets, engine lathes, cutting-off machines, drill presses or any type of chucking machine, the Barker Two-Jaw or Three-Jaw hand operated chuck will increase production up to one third and actually pay for itself while doing it in from 60 to 90 days. Hand lever eliminates pneumatic and hydraulic systems, yet closes and locks jaws with lathe running or stopped. Over 30 years of labor saving, production boosting operation.

Write for bulletin 201 today.



Top
Jaws
open



Hand lever
closes and locks
while lathe is
running.

Jaws locked

CHUCK DIVISION
THOMAS HOIST CO.
 28 S. HOYNE CHICAGO 12, ILL.

Double-Acting Cylinder Is Designed for Air, Water, or Low Pressure Hydraulic Operation

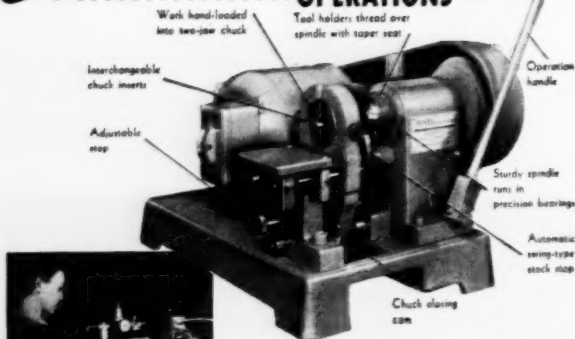
The A. K. Allen Co., 57 Meserole Ave., Brooklyn 22, N. Y., has announced the "AllenAir" Double-Acting Cylinder which is designed for air, water, or low pressure hydraulic operation. Available in 1½, 2, or 3-inch bore, in any stroke, and with either single-ended or double-ended piston rods, the cylinder incorporates Thom-



(Top) "AllenAir" Double-Acting Cylinder. (Bottom) Assortment of interchangeable mountings for the "AllenAir" Double-Acting Cylinder

Speeds

CHAMFERING, POINTING, FACING, REAMING OPERATIONS.....



At Vaco Products Co., Pines Air-Operated End-Finisher Machine speeds production on screw driver bit chamfering operations from 800 to 1500 pieces per hour over old obsolete belt methods.

save time. Forward travel of operating lever clamps and feeds work to rotating cutters in one pass. Operator always has one hand free for stock handling. Equipped with quick, interchangeable tool holders, chuck inserts, 8-speed sheave (760 to 3920 rpm), sturdy spindle, grease-sealed precision bearings. Unit illustrated handles stock diameters up to 2". Maximum feed stroke is 1¼". Automatic air-operated units for higher production work and larger sizes up to 5" capacity are also available.

EXCLUSIVE FEATURES OF PINES END-FINISHER SAVES TIME ON TUBE, PIPE, BAR JOBS

Pines Portable End-Finisher is especially designed for fast, accurate work. Small and compact, its exclusive operating features

Write for Free Bulletin



Write today for more facts. Learn how these machines are built to save time on a wide range of work.

son Nylined bearings and "Copper-brited" honed cylinder tubes for resistance to corrosion. The unusual compactness and ease of assembly and disassembly of the cylinder is achieved by the fastening of the heads, squarely and rigidly, to the cylinder tube with rectangular-section hardened-steel snap rings, re-ground flat and parallel to 0.001-inch tolerance on the thickness.

Adjustable cushions are available front and back on the 2- and 3-inch sizes, and an assortment of interchangeable foot mounts, flange mounts, and clevis mounts allow for the mounting of the cylinder in any manner or position.

PINES ENGINEERING CO., INC.
Specialists in Tube Fabricating Machinery

644 WALNUT • AURORA, ILLINOIS

PRECISIONEERED FOR LASTING ACCURACY!

Vernier Calipers • Height Gauges • Dial Indicators • Tapping Attachments • Automatic Flute-Cutting Machines • Automatic Milling Machines • Center Lapping Machines

Where Precision Counts, Count on Homestrand

HOMESTRAND, INC.

LARCHMONT, N. Y. Phone: Larchmont 2-5550

READING BENCH KEYSEATER

Portable—move directly to job; a time saver for both small and large shops.

3 1/4" stroke; adaptable for other work.

Low first cost — prompt delivery.

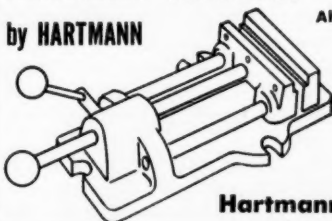
Good dealers wanted.

READING MACHINE CO.
CINCINNATI 37, OHIO



INSTANT ACTION

by HARTMANN

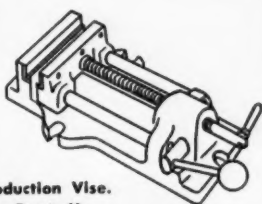


All Purpose Tool Room And Machine Shop Vises.

The JAWSET

Adjustable Pressure Production Vise.
For Information Write Dept. M.

Hartmann Mfg. Co., 1637 Goold St., Racine, Wis.



Dependable MEASURING & CHECKING EQUIPMENT

and Now

HAND WHEELS, KNOBS, HANDLES

Cadmium Plated

Non-rusting — good looking

READY
TO
DELIVER



STRAIGHT and OFFSET TYPE



CAST IRON



SOLID ROTARY
MACHINE HANDLES



MALLEABLE IRON

We also build jigs, fixtures, special tools and machinery. Send us your blueprints.



UNIVERSAL ANGLES
In 10 sizes, ranging from
4 x 3 1/4 x 5 and up.

BOX PARALLELS

In 15 sizes, ranging from
3 x 4 x 12 and up.

SLOTTED ANGLES

In 19 sizes, ranging from
4 x 9 x 5 and up.



SURFACE PLATES

Over 50 sizes, ranging from
7 x 7 1/2 to 96 x 192.

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MACHINE PRODUCTS CORPORATION

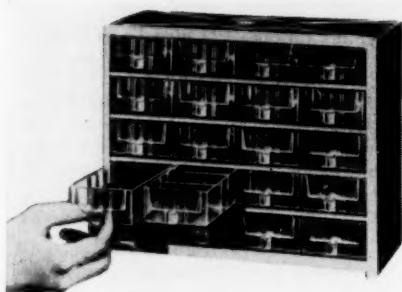
6771 E. McNichols Rd.

Dept. D

Detroit 12, Mich.

Parts Cabinet Features Clear Plastic Drawers

Designated as the Model J-20 "See-Thru," a drawer cabinet which consists of 20 clear plastic spill-proof drawers, measuring $5\frac{7}{8}$ inches long x $2\frac{3}{4}$ inches wide x $1\frac{7}{8}$ inches high, contained in a welded steel cabinet has been announced by General Industrial Co., 5738 N. Elston Ave., Chicago 30, Ill. Designed for small parts storage, the cabinet has a silver-gray hammer



General Model J-20 "See-Thru" Drawer Cabinet

finish and is equipped with rubber feet. The unit measures $10\frac{1}{4}$ inches high x $12\frac{1}{2}$ inches wide x 6 inches deep overall, and adjustable drawer dividers and identification labels are included.

Drawer units with from 8 to 128 drawers, with larger size or metal drawers, and portable models with carrying handles are also available.

No. HU68—
Hydraulic rail
feed universal
joint type
multiple spindle
drilling machine.

For Over 50 Years

MOLINE "Hole-Hog"

Specially Designed

MACHINE TOOLS

MOLINE
TOOL CO.
MOLINE, ILLINOIS

have cut production costs for American Industry.

Countersink and Deburring Tool Feature Single Cutting Edges

The Weldon Tool Co., 3000 Woodhill Rd., Cleveland 4, Ohio, has developed a countersink which is designed for 82-degree angle countersinking and a deburring tool for 90-degree angle deburring operations. Each tool has only a single cutting edge which is said to

MOVEMENT FOR PREPARING JAW SETTING

POSITIVE LOCKING GUARANTEED

Ask your Dealer for demonstration or write for literature.

HEINRICH
Grip-Master
THE ORIGINAL 1914
SCREWLESS VISE

GRIPS WITH SPEED CUTS TOOLING COSTS

Step up drill press production with the Heinrich "Grip-Master" Screwless Vise—with the patented "Circle Grip" hammer blows cannot break. Work is automatically leveled; jaws set instantly, effortlessly. 3", 4", 6", 8" jaw widths; ideal as base structure for drill jigs and fixtures.

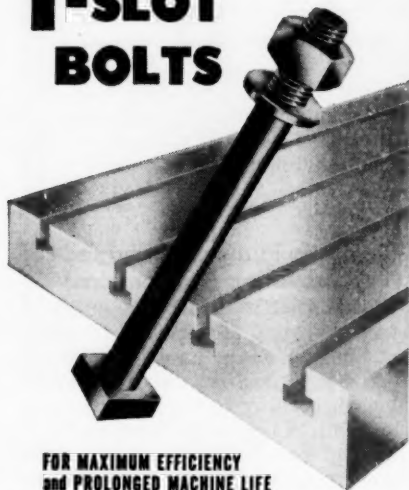
HEINRICH TOOLS, INC.

DEPT. 114-B

RACINE, WISCONSIN

BOYAR-SCHULTZ

Precision-made
ALLOY STEEL
T-SLOT
BOLTS



**FOR MAXIMUM EFFICIENCY
and PROLONGED MACHINE LIFE**

It does not take long to ruin the accuracy of costly machine tools when poorly made, soft steel bolts of ordinary manufacture are used.

Boyar-Schultz T-SLOT Bolts are precision made with heads at right angle to bodies, carefully machined to present a broad, flat surface to the upper surface of the T-slots. They are made from alloy steel forgings, heat treated for maximum properties and are tough and hard. Threads, class 3 fit will not easily strip or distort. Special Nuts and Washers are specially made to give best results with Boyar-Schultz T-SLOT Bolts.

When compared with refinishing and trueing the bed of a machine tool, the cost of GOOD bolts is trifling. *Write for Free Catalog.*

BOYAR-SCHULTZ CORPORATION

2120 Walnut St., Dept. DB, Chicago 12, Ill.

KIPP
Air Grinders

- **FASTER SPEEDS**
- **BETTER RESULTS**
- **LOW PRICES**

MODEL JA
50,000 R.P.M.
Weight 12 ounces; length 6 3/4 inches; chuck size 1/8 inch. Wheel guard removed for better illustration.

\$42
IN U.S.A.

THEY GRIND—NOT JUST RUB!

The RPM's stay up while grinding . . . not only when the grinder runs idle.

It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind . . . not just rub. Every mechanic knows this, but an inexperienced buyer may order tools that maintain proper grinding speeds only when running idle. The speed of Kipp air grinders drops but slightly when put to work. That means better work . . . longer wheel life.

MADISON-KIPP CORP.

208 Waubesa St., Madison, Wis., U.S.A.

Write for KIPP Air Tool Catalog at 3006

*Satisfaction
Guaranteed
Trial Offer*

Anderson NEW, IMPROVED HAND SCRAPER

The new Anderson Model 5-D Hand Scraper is the kind of tool you can't appreciate until you have tried it. So here's our offer: Order as many Model 5-D scrapers as you want. We'll send them promptly. Use them a full week... if they don't live up to all your expectations, send them back to us for refund.

- Faster Cutting
- Easier to Use
- Just the Right Spring
- Palm Fitting Grip
- Light in Weight

18" — 20" — 22" lengths

\$5.80... with high speed steel blades

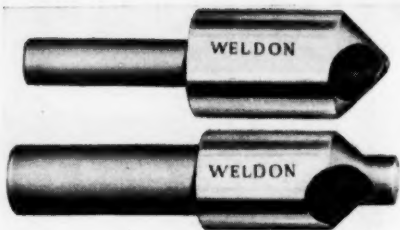
\$8.50... with carboloy-tipped blades

\$1.50... for rubber bumper shown below

ORDER AS MANY AS YOU NEED MONEY-BACK GUARANTEE

Indicate choice of high-speed steel or carboloy-tipped blades, and 18", 20", or 22" lengths. We suggest you include rubber bumpers in your order. Write today!

**ANDERSON
BROS. MFG. CO.
1907 Kishwaukee St.
ROCKFORD
ILLINOIS**



Weldon Countersink and Deburring Tool

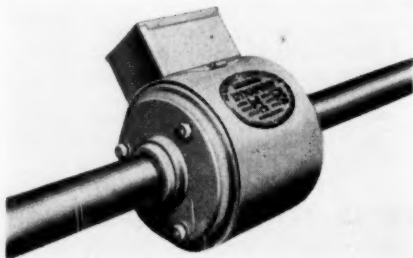
prevent chatter. Both tools are regularly manufactured for right-hand cut in standard sizes but can also be made to suit individual requirements.

Magnetic Pump Is Designed for Circulator Applications

Designated as the "Dynapump," a magnetic pump for circulator applications has been announced by The Fostoria Pressed Steel Corp., Fostoria, Ohio. According to the manufacturer, the pump is unusually quiet in operation and has no shaft seal or motor bearings to require service. Compact and light in weight, the unit is said to provide unusually high heads of 24 feet, making it particularly adaptable for radiant and baseboard heating operations.

All pump parts are made of corrosion-resisting stainless steel, making the unit suitable for either fresh or

Fostoria "Dynapump" Magnetic Circulator



COOLEY HEAT TREATING FURNACES

ELECTRIC BOX TYPE • FLOOR AND BENCH MODELS

For Tools and Small Parts

SHOWN HERE

**THE COOLEY FLOOR MODEL
for HARDENING AND TEMPERING**



Max. Temp.	Sizes	Price
2000°	12" x 8" x 18"	\$1030
	12" x 8" x 24"	to
	12" x 8" x 36"	\$1485
	15" x 12" x 30"	

All prices are less controls. Any standard controls available for automatic temperature control.

- Cooley modern design provides natural convection—increases uniformity. Heavily insulated large area door makes for low heat loss—reduced power needs.
- Natural thermal convection.
- Easily removable heating elements.

Controlling Pyrometers carried in stock—available for all applications.

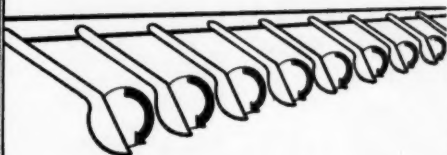
Free on request: ☐ COMPLETE CATALOG ☐ "SHOP NOTES ON HEAT TREATING"

COOLEY

ELECTRIC MANUFACTURING CORP.

14 SO. SHELBY • INDIANAPOLIS, IND.

STOP DUST With DUSTKOP



300 cfm to 10,000 cfm per unit (22 models) standard, pre-tested, available from stock.

Low cost, immediate control of dust from one remote dust source, or from a whole shop!

Ask for catalog
605-2

AGET-DETROIT CO.

207 Main St.

Ann Arbor, Mich.

No obligation.

closed water systems. The standard unit accommodates interchangeable flanges from $\frac{3}{4}$ to $1\frac{1}{2}$ inches.

Automatic Self-Opening Stud Driver Features Collapsible-Type Trip Gage

Designated as the 100 Series, an automatic self-opening stud driver which features a collapsible-type trip gage

has been announced by Titan Tool Co., Main St., Fairview, Pa. According to the manufacturer, the driver is designed for rugged use and eliminates the marking of stud threads. The driver is also said to be positive in drive and automatically grips and releases the stud without screwing. The collapsible-type trip gage, it is claimed, has a large adjustment range which is made possible by an all-thread ring.

The Titan 100 Series Stud Driver also features automatic take-up for wear on the jaws. Reversing the position of the clutch is said to

POLISH • GRIND • BURR • SHARPEN IN SECONDS... WITHOUT TEARING DOWN SET-UPS

Do It Faster With A DREMEL MOTO-TOOL

Dremel Moto-Tools are used in many different types of industries by thousands of diemakers, machinists and hobby craftsmen for polishing and grinding dies, burring parts, sharpening cutters, etc. A money-maker and time-saver, the Moto-Tool does close work in seconds without tearing down costly production set-ups.

**APPROXIMATELY
27,000 R.P.M.**

MOTO-TOOL NO. 2, with one emery wheel point..... **\$17.85**

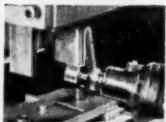
MOTO-TOOL KIT NO. 2, with 23 accessories (high speed steel cutters) and Model 2 Moto-Tool in sturdy steel case..... **\$25.95**



GRINDING



SHARPENING

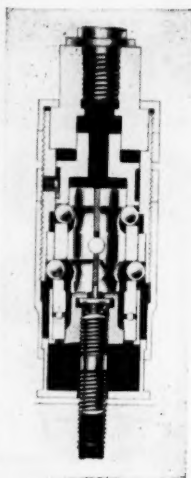


BURRING



See Your Nearby Industrial Distributor or write for catalog.

DREMEL MFG. CO., Dept. 224-B, Racine, Wis.

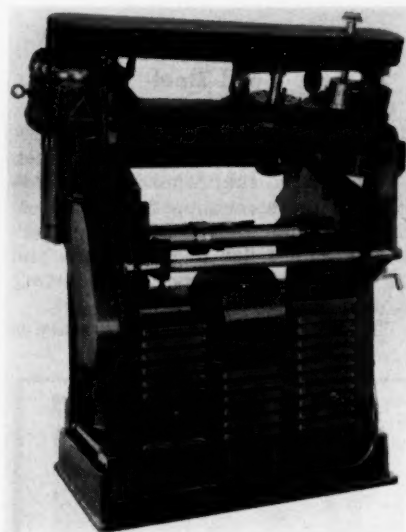


Titan 100 Series Stud Driver

provide for double wear. The driver, it is claimed, affords accurate projection heights and can be used with any air or electric drill or drill press.

Machine Indexes Pieces Through Spot Grinding and Brinell Testing Stations

Designated as the Model RCB, a semi-automatic Brinell testing machine which is said to automatically index test pieces through both spot grinding and Brinell testing stations has been announced by Detroit Test-



Detroit Model RCB Semi-Automatic Brinell
Testing Machine

ing Machine Co., 9390 Grinnell Ave., Detroit 13, Michigan.

According to the manufacturer, a wide variety of pieces, such as crankshafts, gun barrels, or other shaft-like parts, are fed into the machine at a rate of 400 per hour. When the pieces slide out, they are ready for inspection. Designed primarily for testing crankslide out, they are ready for inspection. work opening and is hydraulically operated. The Model RCB can be modified to meet the user's own particular specifications.

February, 1954

VIMCO *Light*



INTRODUCING JOHNNY - ON - THE - SPOT

*The Light that Made
Thousands of Machines*

"LIGHT INDEPENDENT"

Vimcolights provide the proper light to take the eyestrain out of machine operations.



Production remains high all shift long . . . rejects are fewer. Savings quickly cover the initial cost. Send for new bulletin number 85.

*All standard models
Underwriters Listed*

VIMCO MFG. CO., Inc.

SINCE 1919

111 Brayton Street

Buffalo 13, N. Y.

MODERN MACHINE SHOP 341

Radius Dresser Provides Maximum Rigidity

General Scientific Corp., Dept. M-1,
603 N. La Brea Ave., Los Angeles,



"Little General" Radius Dresser

Calif., has developed a precision radius dresser, designated as the "Little General," which is designed to give the machinist perfect "feel of the wheel" when dressing a radius. Ruggedly constructed, the dresser is said to provide maximum rigidity. According to the manufacturer, angles tangent to radii

can be quickly and easily dressed, and radius dimensions can be rapidly and accurately set.

The unit, it is claimed, has a range for producing radii of from 0.001 and 0.002 inch (needle diamond permitting) up to $\frac{1}{16}$ inch. Diamond concentricity is said to be completely adjustable, permitting an accurate radius to be dressed.

Lapping Plate Is Made of Semi-Steel

Glover Mfg. Co., 736 Mohican Place, Meadville, Pa., has announced a lapping plate which is made of semi-steel, a stable metal that is made from cast iron and new steel in pig form. According to the manufacturer, the plate surface is lapped flat to 0.0001 inch and the sides and bottom are surface ground.

The surface of the lapping plate is



MARK OF QUALITY

STANDARD STEEL SPECIALTIES

• MACHINE KEYS

We can supply a complete line of finished machine keys including gib head and taper keys, rod keys, round end keys, etc.

• WOODRUFF KEYS

Complete stock of standard keys on hand for prompt shipment. Made from open hearth or alloy steel.

• TAPER PINS

Available in sizes 7/10 through 10 and lengths from 3/4 inch to 6 inches. Others made to specifications.

• MACHINE RACK

Can furnish rack from almost any size blank and pitch as well as length to form continuous sections.

Write for catalog

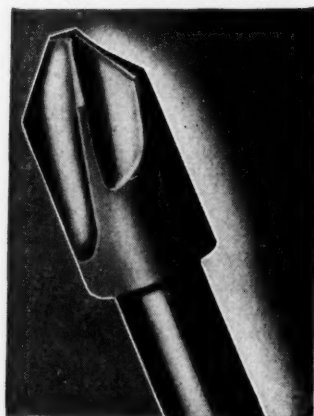
STANDARD STEEL SPECIALTY CO.

JEANER FALLS

PENNSYLVANIA

Plants: Beaver Falls, Pa.; Hammond, Ind.

SOLD THRU LEADING SUPPLY HOUSES



GROBET CENTERLESS COUNTERSINKS

Six staggered cutting edges give shearing cut that eliminates all chatter.

Send for catalog BCI.

GROBET FILE CO. of AMERICA, INC.
421 Canal Street N. Y. 13, N. Y.

***"I'm proud to be
a Savings Bonds salesman
for Uncle Sam..."***

CHARLES M. WHITE
President
Republic Steel Corporation



"... and I urge every business executive in the nation to advance the cause of American enterprise in this way.

"Every one of us at Republic Steel is proud of the results of our Payroll Savings campaign: 96.7 per cent of our employees saving systematically from each pay in U.S. Savings Bonds. These results were possible only because all 68,344 of us at Republic were part of an enthusiastic team. We feel that this is the best way we can demonstrate our appreciation of the efforts to have a sound dollar and a stable economy."

- 96.7% of Republic Steel's 68,344 employees—over 66,000 men and women—are enrolled in the Payroll Savings Plan.
- These 66,000 members of Republic's "enthusiastic team," as Mr. White so aptly terms them, are investing more than \$16,000,000 per year in U.S. Savings Bonds.
- In addition to building personal security, these men and women of Republic are making a very important contribution to America's "efforts to have a sound dollar and a stable economy."

Certainly Republic Steel's Payroll Savings record is outstanding—one of the best in the country. But it is not unique. Other companies have comparable records, measured in percentage of employee participation, or in annual Savings Bond purchases.

A wire or letter to Savings Bonds Division, U.S. Treasury Department, Washington, D.C., will bring prompt cooperation from your State Director. He will show you how easy it is to join Mr. White as a Savings Bond Salesman for Uncle Sam, with a company Payroll Savings Plan that you can be proud of.

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MODERN MACHINE SHOP

Dovetail

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Heavy Duty

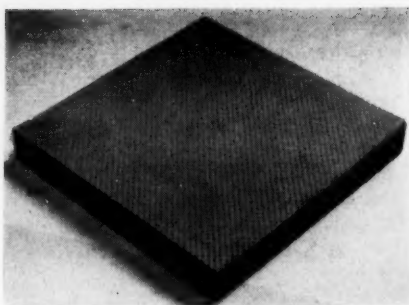
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Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

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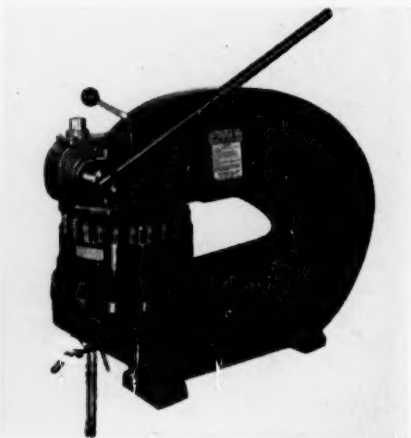
Glover Semi-Steel Lapping Plate

made up of $\frac{1}{8}$ -inch squares with 0.020-inch deep slots, and the corners of the plate are radiused. The semi-steel lapping plate is available in two sizes measuring $\frac{7}{8} \times 6 \times 6$ inches and $1 \times 8 \times 8$ inches.

18-Station Machine Punches Any Shape Hole

An 18-station rotary turret punch press which is designed to punch any shape hole has been announced by Rotex Punch Co., Inc., 2350 Alvarado, San Leandro, Calif. According to the

Rotex 18-Station Rotary Turret Punch Press



manufacturer, the desired punch-and-die set is brought into position instantly by a rapid, manual turn of the turret and locks into place with accurate alignment. Punch-and-die sets, it is claimed, can be made to user specifications or are available in a wide variety of round or irregular shapes and sizes up to 2 inches in diameter. The machine is said to be capable of punching metals, plastics, cardboard, fiberboard, leather, and other sheet material.

Strap Clamps Are Available in 22 Sizes

Northwestern Tool & Engineering Co., 119 Hollier Ave., Dayton 3, Ohio, has increased its number of available strap clamps to 22 sizes. According to the manufacturer, this wide range of sizes will accommodate over 90 per cent of all clamping operations on punch presses, milling machines, jig



Northwestern Strap Clamps

borers, and other metal and wood-cutting machinery. A leaflet giving complete details is available.

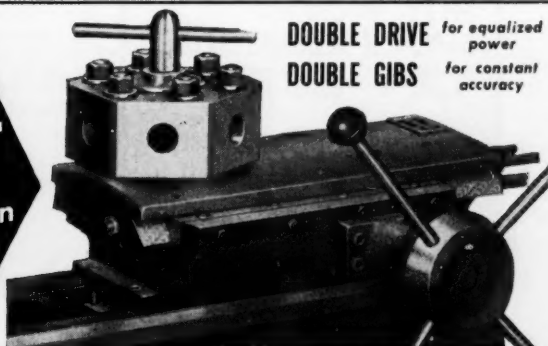
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Self-Indexing
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For Lower Production
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Output

- ✓ Custom built to fit all lathes from 9" to 18".
- ✓ Smooth, sensitive control with Pilot wheel drive through twin gears and racks.

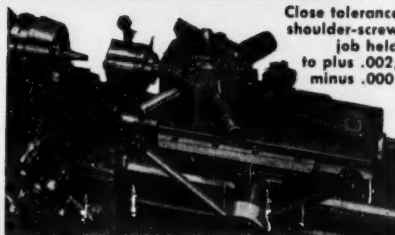
- ✓ All bearing surfaces hand scraped.
- ✓ All parts of indexing mechanism hardened, assuring accuracy.

Manufacturers of the most complete line of Hexturret Bed Turrets, Turret Tool Posts and Tail Stock Turrets in the country.
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DOUBLE GIBS for constant accuracy

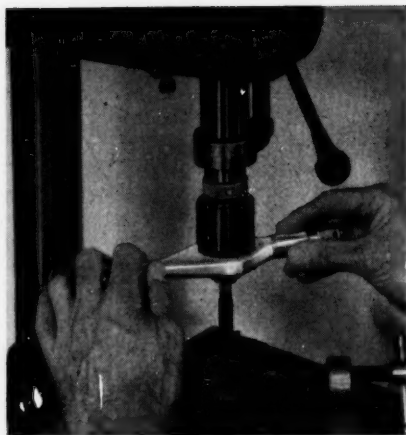


Close tolerance
shoulder-screw
job held
to plus .002;
minus .000.

Reasonable Deliveries

Chuck Wrench Is Designed for Hand Tapping and Reaming Operations

Designated as the "Tappo," a chuck wrench which is designed for hand tapping and reaming operations on a drill press or milling machine has been announced by Gilbert Mfg. Co., 139 Riverview Ave., Elkhart, Ind. The chuck wrench frame is made of light-weight high-strength aluminum alloy, and the screw-style handle is made of



"Tappo" Chuck Wrench in use on a drill press

Columbia

TOOL STEELS for
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**HOT WORK-
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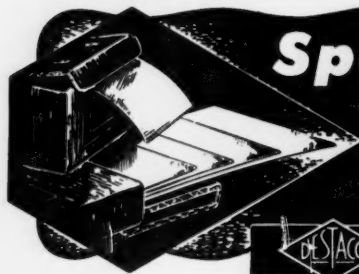


**COLUMBIA TOOL
STEEL COMPANY**

Main Office & Works
Chicago Heights 6, Ill.

high-grade cold-rolled steel, heat treated and plated. The handle is held within the frame by an Escutcheon pin which prevents full retraction of the handle from the frame. Compact and streamlined in design, the chuck wrench requires little room in a tool box or apron pocket.

The chuck wrench has a tapping capacity ranging from $\frac{1}{16}$ -64 N.S. through 9/16-12 N.C. and a reaming capacity of from $\frac{1}{8}$ -inch diameter through $\frac{1}{2}$ -inch diameter. The wrench fits a conventional 6A, 0 to $\frac{1}{2}$ -inch capacity key-style chuck, measuring $1\frac{7}{16}$ -inch o.d. at the keyhole body portion.



Specify



**SHIM
STOCK**

Made from selected steel or brass, rolled to precision limits, oiled to resist stain and rust, free from burrs. Twelve assorted thicknesses .001" to .015", sheets 6" x 12", coils 120", identified every 6" by thickness and amount remaining on roll.

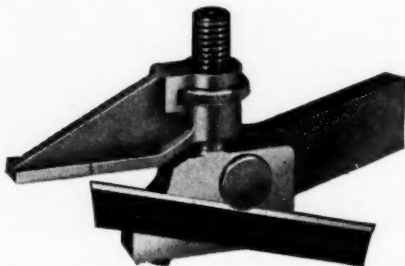


DETROIT STAMPING COMPANY

349 MIDLAND AVENUE, DETROIT 3, MICHIGAN

Floating Cut-Off Toolholder Is Constructed to Eliminate Chatter

Designated as the "Novi," a floating cut-off toolholder for cutting off mate-



"Novi" Floating Cut-Off Toolholder

rial in a lathe has been announced by Novi Tool & Machine Co., 25806 Novi Rd., Novi, Mich. By means of a steady

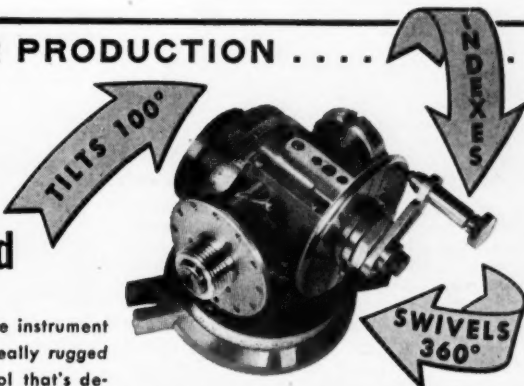
rest which holds the workpiece down, the toolholder, it is claimed, minimizes the tendency of the stock to lift and climb on the tool, causing the tool to break and ruining the workpiece. The tool and the stock are both held steady in relation to each other. The steady rest floats on the workpiece, eliminating the danger of breakage because of faulty setup. Designed for cutting off stock up to 2 inches in diameter, the toolholder is made to fit the tool post of a 10-inch lathe; however, it can also be used on larger lathes, if desired.

According to the manufacturer, the toolholder operates on power cross feed, as well as hand feed, the steady rest being adjustable to any diameter of stock up to 2 inches by simply turning a knurled thumbscrew. The toolholder is supplied complete with a specially-designed free-cutting type of cut-off blade.

FOR FASTER PRODUCTION . . .

the **ELLIS** dividing head

Although it is built to fine instrument standards, the ELLIS is a really rugged tool room or production tool that's designed for unusual versatility. Its universal motions — swiveling in two planes — will save time and increase profits and accuracy on your millers, grinders, drill presses and jig borers. It has 6½" swing, or 11"



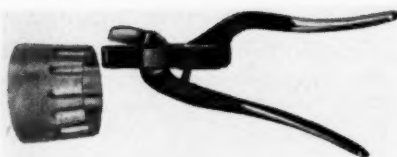
swing when used with riser blocks. Work may be held between centers, or in chucks or collets. To save rehandling of work, and to save money, investigate the ELLIS by writing for complete details!

ASTE Show — Booth 1431

NICHOLS-MORRIS CORP. 76-H MAMARONECK AVE.
WHITE PLAINS, N. Y.

Hand Tool Crimps Any Size Sheet Metal Pipe up to 20 Gauge

Whitney Metal Tool Co., 110 Forbes St., Rockford, Ill., has introduced the Whitney-Jensen No. 111 Hand Pipe Crimper which, it is claimed, will put good crimps in the open end of any size sheet metal pipe up to 20 gauge. Operation of the tool is simple. Squeezing the handles together brings the 1½-inch long forming jaw down into the open anvil jaw and forms the crimp



Whitney-Jensen No. 111 Hand Pipe Crimper

to the depth or length desired. Spring return opens the handles, which are smoothly polished.



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reduces stress, produces smooth operation
of our crankshafts...and makes it so
**EASY TO LOCATE EXACT POINT
OF UNBALANCE ...**

**QUICKLY,
ACCURATELY!**

says M. W. Stillier,
Prod. Mgr., Joy Mfg. Co.,
Michigan City, Ind.
A Model 375 "Bear"
Machine is used here
to balance crankshafts for
portable air compressors.

Photograph shows
operator drilling away
excess metal at point
of unbalance.

Speed and accuracy are but two of many advantages which make "Bear" Dy-Namic Balancing the proven technique to reduce wear of valuable machinery... eliminate noise and vibration... and improve performance of the finished product.

SEND FOR FREE DY-NAMIC BALANCING MANUAL to learn of all the advantages of "Bear" Machines, 20 pages of tables, diagrams, application photographs and latest technological developments help show you how Dy-Namic Balancing can cut costs, mechanical failures and maintenance expense in your operation.



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"BEAR"

STATIC AND DY-NAMIC BALANCING MACHINES

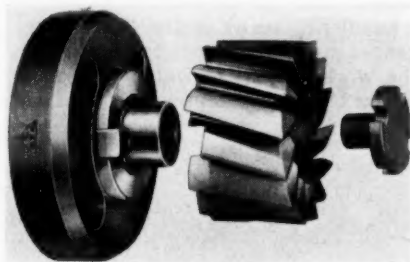
balance rotating parts weighing from 4 oz. to 8 tons

V-Belt Has High H.P. Capacity

Raybestos-Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J., has introduced a V-belt, designated as the R/M "Super-Power," which has an unusually high horsepower capacity. Constructed of all-synthetic rubber, the belt is said to be oil-proof, non-sparking, and heat-resistant. The belt provides for long service, withstands shock with unusual elastic resistance, and requires minimum take-up maintenance. The design of the belt includes a synthetic fiber strength member for maximum power, and the belt is said to have practically no stretch.

Heavy-Duty Adapter Is Designed for Shell End Mills

A quick-change type shell end mill adapter which is standardized for No.



Goddard & Goddard Quick-Change Type Shell End Mill Adapter

50 N.S. drive milling machines has been developed by Goddard & Goddard Co., P. O. Box 68, Brightmoor Station, Detroit 23, Mich. Available in two arbor sizes which fit standard shell end mill bores, the adapter mounts direct-

ly on the front spindle flange of the machine. Standard bolt holes and key slots are said to afford rigid mounting and positive drive. Tool rigidity is provided by bolting direct to the spindle face and minimizing chatter. Concentricity is said to be assured by locating from the o.d. of the spindle.

Made of case-hardened 8620 steel, the adapter has hard bearing surfaces, and all locating surfaces are ground parallel and concentric.

Instrument Checks Fine-Pitch Gears

Designated as the No. 4 Fine-Pitch Red Liner, an instrument which is designed to provide the type of measurement designated by the A.G.M.A. as a "composite check," by which all gear errors are measured in combination, has been developed by The Fellows Gear Shaper Co., 78 River St., Springfield, Vt. According to the manufac-



Accurately, Directly, Reads End Diameters Of Chamfers Up To 1". TWO MODELS—From 0° Chamfer To 90° and 90° Chamfer To 127° included angle maximum Chamfer

Chamfer Depths Easily Computed

● Reads like any standard depth micrometer. Precision made for close tolerance work. Saves time, reduces error, reduces rejects. Quickly pays for itself. Send for details NOW!



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Simple To Use

MFRS. OF STANDARDIZED DRILL JIG AND FIXTURE BUSHINGS

(Advertisement)

Screw Machine Attachment Eliminates Separate Marking Operations

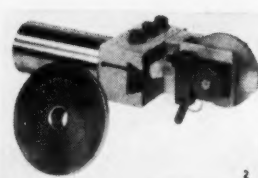
Automatic die marking of part numbers, patent numbers, trade marks, etc., during the operating cycle of automatic and hand operated screw machines, bench and turret lathes, etc., on almost any surface of a part is possible with the complete line of automatic roll markers available from New Method Steel Stamps, Inc., 147 Joseph Campau, Detroit 7, Michigan.

Suitable for both light and heavy work, the markers are practically fool-proof and eliminate the need for separate setups for marking, thus reducing cost, scrap, etc. Quick interchangeable roll dies give remarkable versatility and reduce time for setup changeover.

Illustrated are two of the three basic models of the cost cutting markers. Model 700 (not shown) is for marking and cutting off at the same time. The marker occupies the cutoff slide, leaving other stations open for machining operations. New Method also manufactures a complete line of hand stamps, inspectors' stamps, embossing dies, marking hammers, type and type holders, etc. Precision marking and engraving services available.



1. Model 500-C for automatically marking on outside cylindrical surface of screw machine parts.



2. Model 600-E for marking on the end face of parts. Normally installed in tailstock of a screw machine or similar position on other machines.

turer, the instrument will measure gears of 20 pitch and finer up to 4 inches pitch diameter, external or internal. The master gear is mounted on an arbor in a movable spring-loaded carrier and can be rotated either by a handwheel or by motor. The master gear is meshed, without backlash, with the work which is located in a fixed holder or on fixed centers. As the mas-



Fellows No. 4 Fine-Pitch Red Liner

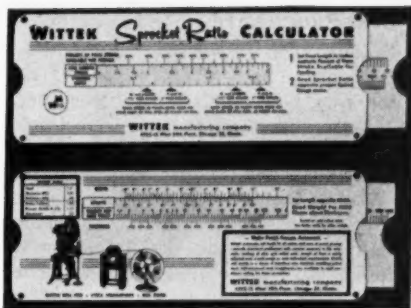
ter and the work rotate in intimate contact, any variation in center distance is measured and recorded on a constantly moving paper chart. The center distance variations are detected by an electrical sensing device, the output signal being amplified to operate an electrical recorder.

The instrument can be furnished in a bench type or with a cabinet. Headstock and tailstock centers, and a 1/10,000-inch dial indicator for visual inspection without a chart, are furnished as standard equipment. A turret-type fixture, designed for holding

several different designs of gears and pinions under $\frac{1}{2}$ -inch diameter, is also available. The turret fixture is so arranged that a gear or pinion can be loaded in an open position and turned under the master gear to a fixed stop which locates it in the proper position.

Sprocket-Ratio Calculator

Wittek Mfg. Co., 4322 W. 24th Place, Chicago 23, Ill., has released a slide rule calculator for determining at a glance the correct sprocket ratio to be used on the chain drive for the Wittek automatic roll feed for punch presses. The sprocket ratio determines the rate at which stock is fed to the press for each piece. This rate depends upon the length of feed and the per cent of the press stroke available for feeding. The required sprocket ratio can be read direct on the calculator for any combination of feed length and per cent of stroke between 1 and 18



Wittek Sprocket-Ratio Calculator

inches for length of feed and from 25 to 80 per cent of stroke.

The opposite side of the calculator is a slide rule for determining the weights of metal pieces, using the length, width, and thickness of the piece and the material factor from the table. The calculator is available free of charge.

NOW -- PRECISION THREADING

with the New Spring and Swivel Holder



PRECISION GROUND LONG LIFE CUTTERS

—for all standard thread forms.

- 60 degree thread
- 55 degree thread
- Acme thread
- Square thread
- High Speed Steel or Carbide Tipped



AMAZING SPRING ACTION

EASY ADJUSTMENT OF ANGLE OF LEAD by simply turning front part of holder.

**All Standard Sizes
Available
From Stock**

for free catalog write

**R. B. TOOL CO.
INC.**

783 North Broadway, White Plains, N. Y.

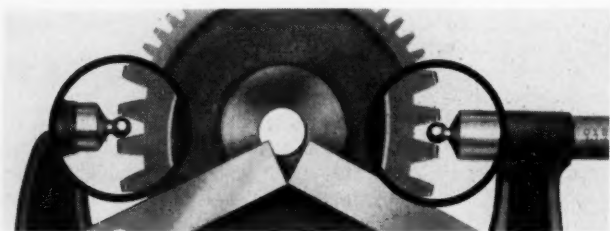
Unit Punches Mild Steel up to $\frac{1}{4}$ -Inch Thick

Designated as the Wales Type "JD," a hole punching unit which is designed to punch mild steel up to $\frac{1}{4}$ -inch thick and which may be used and re-used in unlimited setups has been announced by Wales-Strippit Corp., 398 Payne Ave., North Tonawanda, N. Y. Each punch assembly and die assembly is independent and self-contained. The punch assembly consists of holder,

punch, stripping spring, punch guide, and pilot head. The die assembly consists of holder, die, and pilot pin. According to the manufacturer, the unit provides for punching holes at practically any center-to-center distance over large, as well as small, sheets of material, the only limiting factor being the size of the die set or press.

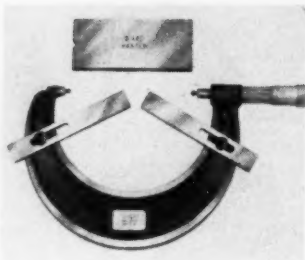
The punch and die assemblies are mounted in die sets and operate in a press the same way as conventional

dies, permitting unobstructed feeding. The punching unit may be mounted directly to stand-



Speed, Simplify Gear Inspection with BALL MICROMETERS

These precision tools quickly check tooth thickness and pitch diameter. Opposing balls, accurate to .0001", are an integral part of the micrometer. Masters can be supplied or you can make comparative measurements with a perfect gear. Parallel guides assure gear leveling and positive readings. Standard balls $\frac{1}{8}$ " to $\frac{1}{4}$ " in $\frac{1}{64}$ " increments. Can be used in place of rolls in most applications. Other sizes also available.

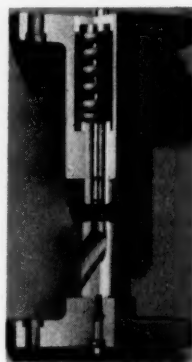


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Distributor Inquiries Invited.**



GAGE COMPANY

354 Fair St. • Detroit 20, Michigan



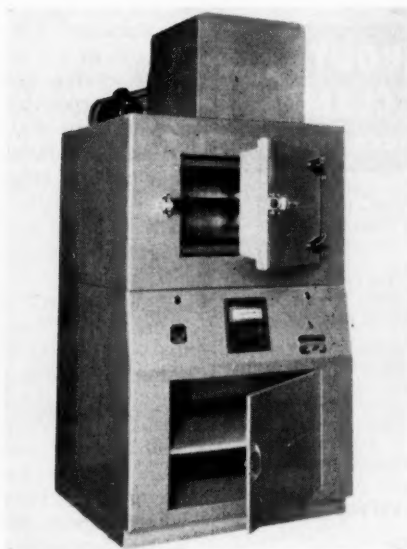
Wales Type "JD"
Hole Punching Unit

ard flat surface die sets or on templates which are then mounted into die sets.

The unit is available in two holder sizes to punch round or shaped holes up to $\frac{7}{8}$ inch in diameter.

Recirculating Furnace for Temperatures up to 1,250 Degrees Fahrenheit

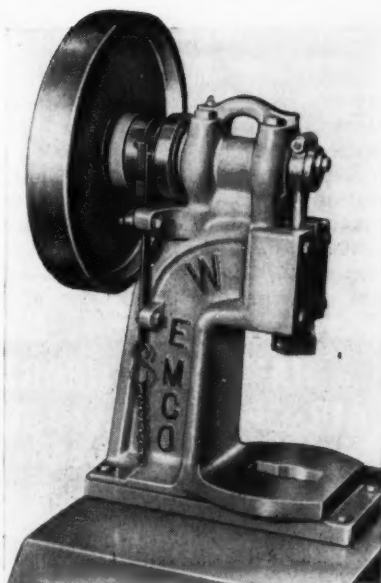
K. H. Huppert Co., 6841 Cottage Grove Ave., Chicago 37, Ill., has announced an electric box-type recirculating furnace for temperatures up to 1,250 deg. F. The furnace is available in nine different sizes and two different heat ranges, 0 to 800 deg. F. and 0 to 1,250 deg. F. The sizes which are



Huppert Electric Box-Type Recirculating Furnace

available range from 18 inches wide x 12 inches high x 18 inches deep to 24 inches wide x 24 inches high x 36 inches deep.

The Huppert Electric Box-Type Recirculating Furnace is mounted on a skirt-type cabinet and is furnished complete with a Huppert Infitol, electronic indicating temperature controller, contactor, and switch box. The exterior of the furnace is finished in a baked-on green Hammerloid.



Emco "W", bench type, 5-ton; also larger Emco "X", 10-ton. Both sizes also stand-mounted. With or without motor drive.

EMCO POWER PUNCH PRESSES are SPEEDY and SAFE

Versatile Emco presses excel for punching, forming, stenciling and riveting metal, leather, plastics and other non-metallic materials. Up to 300 operations per minute. "Big machine" speed, strength, rigidity, accuracy, endurance. Compact, fool-proof; simple design—easy to operate. Thousands of Emcos in money-making use testify to Klaas' dependability since 1921. Two practical sizes:

Emco "W"— $\frac{3}{4}$ ", 1" and $1\frac{1}{4}$ " standard strokes.

Emco "X"— $1\frac{1}{2}$ " and 2" standard strokes.

Ask for our Bulletin "S-2".

UNUSUAL
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TO
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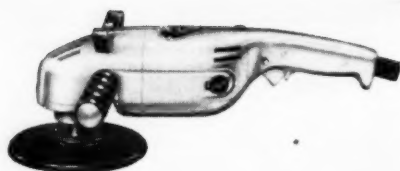
**KLAAS MACHINE &
MFG. CO.**

4334 East 49th St.
Cleveland 25, Ohio

KLAAS-BUILT

Sander Is Available in Standard and Heavy-Duty Models

Available in standard and heavy-duty models designated as the Models 851 and 852, respectively, a 7-inch disc sander which has a speed of 4,500 r.p.m. and which features a front handle location to take the weight off the operator's hands has been announced by The Skil Corp., 5033 Elston Ave., Chicago 30, Ill. Short in length and light in weight, the sander has a ca-



Skil 7-Inch Disc Sander

capacity for a 7-inch disc and pad and a 7-inch flexible reinforced grinding disc.

Operating on standard 115-volt d.c. or a.c. up to 60 cycles, the unit incorporates a dust-tight double-pole momentary-contact trigger switch with a lock and has ball bearings throughout.

Standard equipment furnished with each sander includes a 7-inch molded rubber backing pad, backing pad nut, flange for grinding wheel, three assorted sanding discs, detachable front handle for right or left-hand use, tool rest, wrench, and three-wire cord and connector. The Model 851 measures 15½ inches in length and weighs 11¾ lb., and the Model 852 is 16 inches long and weighs 13 pounds.

HAVE YOU HEARD ABOUT AIR-OPERATED TOGGLE CLAMPS to step up your clamping operations?



Knu-Vise (AODT-400)
Double-toggle Clamp to clamp "around the corner"

Knu-Vise (AO-400)
Toggle Clamp for conventional clamping.

In cases where the cylinder interferes with conventional clamping, the Double-Toggle Clamp shown at the top serves such difficult mounting situations as illustrated in the superimposed line drawing.

Available in 3 series

- For 200 lbs. clamping force
Models AO-200 and AODT-200
- For 400 lbs. clamping force
Models AO-400 and AODT-400 (illustrated)
- For 1200 lbs. clamping force
Models AO-1200 and AODT-1200

Cylinders can be easily rotated to suit air supply from either left or right side.

Send for complete information

**KNU-VISE
PRODUCTS**

LAPEER MFG. CO.

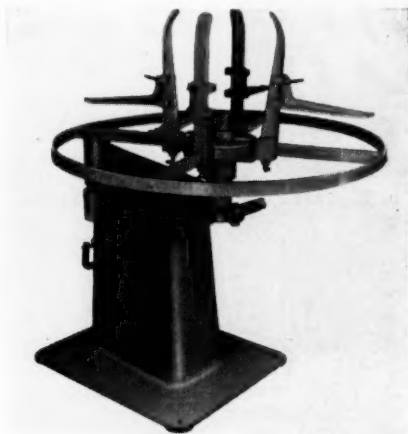
3048 DAVISON ROAD • LAPEER, MICHIGAN

WESTERN DIVISION—422 MAGNOLIA
CANADIAN DIVISION—HIGGINSON ENGR.

• GLENDALE, CALIF.
• HAMILTON, ONT.

Clutch Reel Features Automatic Stop Control

A medium-size wire and stock reel designed with a 4-inch oscillating movement has been announced by A. H. Nilson Machine Co., 1514 Railroad Ave., Bridgeport 5, Conn. The oscillating feature is said to reduce the load on the feed mechanism of the machine and, by means of a limit switch, automatically stop the machine in case of wire entanglement on the reel. A spiral spring holds back the coil which is



Nilson Clutch Reel

suspended and pivoted to a vertical shaft.

The 4-inch oscillating movement, it is claimed, compensates for pulls on the stock. Overtravel of the reel beyond the 4-inch oscillating movement is said to automatically stop the machine.

The clutch reel is available in two sizes; namely, the Model 51-L which has a coil capacity of 175 lb. and an 8-inch minimum inside diameter and the Model 51-M which has a 250-lb. coil capacity and a 12-inch minimum inside diameter.

EXTRA FEATURES

... at NO
EXTRA COST!



... this NEW STERLING Model "G" Universal Tool & Cutter Grinder

Completely NEW from base to wheel head. Designed with these extra features to give you FASTER grinding performance.

- Direct drive Exello spindles
- 360° wheel head rotation
- 10 3/4" swing over table
- Convenient controls for operating from any position
- 27" between centers
- 180° table rotation
- 2 speed manual table traverse
- Micrometer taper adjustment

The new Sterling Model "G" can easily handle all the tool and cutter grinding in the average shop. Available in either the Universal or Plain grinder.

SAVE TIME and do those EXTRA jobs with a Model "G" Sterling grinder.

MCDONOUGH MANUFACTURING
COMPANY
1521 Galloway • Eau Claire, Wisconsin

Hydraulic Lift Truck Can Be Operated by Remote Push-Button Control

Providing a maximum lifting speed of 40 feet per minute, a battery-operated hydraulic lift truck, identified as the "Timesaver," which features a remote push-button control that allows the operator to ride on the forks or platform to the top of the lift while operating the raising and lowering

mechanism has been announced by Big Joe Mfg. Co., 900 W. Jackson Blvd., Chicago 7, Ill. The truck incorporates a built-in automatic "trickle" battery charger which can be plugged into any 110-volt outlet. Overnight charging, it is claimed, will restore the battery; however, the unit may be left "plugged in" over a week end without damage.

A special flow regulator is said to hold the downward travel of the load to a creeping speed even in the event of hydraulic hose failure,



Danly Universal Automatic Stop

4" sq by 6" long with 4" maximum extension.

Danly Primary Stop

1 1/2" thick by 2 1/2" wide by 2 1/2" long

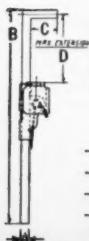
Durably made of quality stock . . . simple and easy to attach . . . can be fitted to any die in 10 to 15 minutes. Adaptable to blanking, progressive or compound dies and can be used on strippers 5/16 inch thick and up. Works well on either right or left hand feeds—or with light or heavy material. Provides long, trouble-free performance.

Pays for itself after a few short runs

Automatic Stop individually packed with Trip Spring and Mounting Screws. . . . \$2.50 each

Primary Stop . . . \$6.00 doz.

(Discount for quantity orders)



Automatic Stop

	A	B	C	D
No. 1A	3/16"	5"	3/8"	3"
No. 2A	1/4"	6"	3/4"	4"

Specify right or left hand

Primary Stop

	A	B	C
No. 1P	1/16"	3/8"	2 3/8"
No. 2P	3/32"	3/8"	2 3/8"
No. 3P	3/16"	3/8"	2 3/8"



Big Joe "Timesaver" Hydraulic Lift Truck

and the hydraulic motor, assembly, and battery are all easily accessible. The lift truck has a short turning radius of 33 1/2 inches, thus permitting it to be easily operated in close quarters.

For immediate delivery, specify size and mail orders to
DANLY MACHINE SPECIALTIES, INC.

2100 South Laramie Avenue, Chicago 50, Illinois

Variable Speed Motor Control for Lathes

A variable-speed control for lathes and other machines powered by fractional and 1-h.p. d.c. motors has been announced by Electro Products Laboratories, 4501 N. Ravenswood Ave., Chicago 40, Ill. The device is said to effect important time savings, particularly when several operations requiring different speeds are performed on the same piece of work. Operations which require repeated starts and

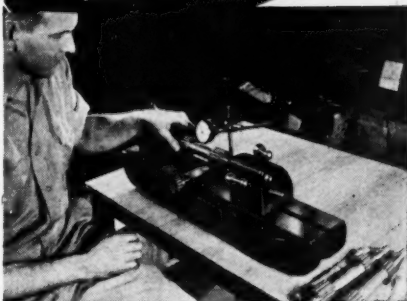


Electro Variable-Speed Motor Control
mounted on Sheldon lathe

stops and reversals are said to be speedily and easily performed.

Essential controls for the unit are located within easy reach of the machine operator, as shown in the accompanying illustration. To change speeds, the control knob, **A**, can be moved easily from one setting to another without loss of time. A field and armature d.c. power supply unit is shown at **B**. The control, it is claimed, has a large short period overload capacity and will start readily.

Keep a Close Check On Accuracy With SUNDSTRAND Bench Centers



Simplify assembly, lower spoilage and get better production from this modern Sundstrand Bench Center. You'll check work between centers easier, faster and within limits of .0001" on this improved Sundstrand Bench Center.

"One-hand control" over all movable elements leaves the operator's other hand free to control rotation of the part being checked. Either headstock or tailstock can be unclamped, positioned and locked in place with a single hand operating the top lever. Investigate this bench center today.

Complete Range as Follows:

6" x 18"	12" x 48"	24" x 48"
6" x 36"	12" x 60"	24" x 60"
12" x 36"	12" x 72"	24" x 72"

FREE Additional Data

covering complete specifications and additional features is contained in this bulletin. Write for your copy. Ask for data sheet 541.



SUNDSTRAND MACHINE TOOL CO.
2539 Eleventh Street, Rockford, Ill., U.S.A.

Gage Measures Skirt Contour of Pistons

The Taft-Peirce Mfg. Co., Woonsocket, R. I., has developed an air-operated gage for measuring the skirt contour of pistons for six-cylinder automotive engines. The gaging fixture and centralizing table are mounted on an index table, graduated in 5-degree increments, which can be rotated 360 degrees.

The tungsten carbide measuring contact is reed-mounted and hori-

zontally adjustable to permit the inspection of pistons of various sizes. Magnification of the standard single-dial CompAIRator is 415 to 1, with dial graduations of 0.0002 inch. A built-in master setting device is said to ensure accuracy of readings. The piston is clamped in the correct position, held between a V-block locator and an opposing cushion block. After the centralizing table has been adjusted to the individual piston, the oval-shaped skirt contour can be checked for deviation at any radial point by rotating the index table.

World's Hardest Metal



Many times more durable than steel, Talide Metal adds years of life to the wearing edges of tools, dies, machinery and equipment. Hard as a diamond and almost indestructible, it triples output per man and per machine. For good service and recommendations for improving any cutting, drawing or wear-resistant application, send particulars to Metal Carbides Corp., Youngstown 7, Ohio. Write for Catalog No. 54-G

TOOLS



BLADES



ROLLS



BAR STOCK



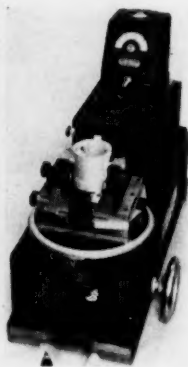
DIES





METAL CARBIDES CORPORATION
TALIDE
YOUNGSTOWN 7, OHIO

SINTERED CARBIDES • HOT PRESSED CARBIDES
HEAVY METAL • CERMETS • HIGH TEMPERATURE ALLOYS
OVER 25 YEARS' EXPERIENCE IN TUNGSTEN CARBIDE METALLURGY

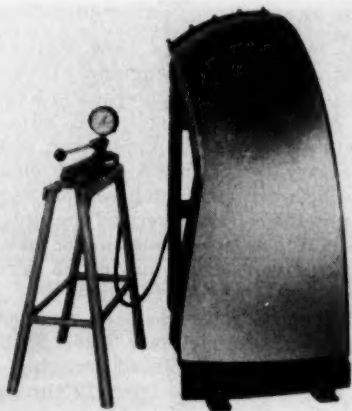


Taft-Peirce Piston Skirt Contour Air Gage

The gage is also available without a centralizing table, the table being replaced with a three-jaw centralizing mechanism which locates and clamps on the piston groove lands.

Stretch Forming Press for Magnesium Features Thermostatically-Controlled Heat

R. A. Lalli Co., 267 Madison Terrace, Bridgeport, Conn., has announced a self-contained stretch forming press with a shell die made of sheet steel ranging from 0.074 to 0.125-inch thick that features thermostatically-controlled heat. The machine is designed to stretch form magnesium parts for aircraft, such as outside skins, fairings, panels, and other fuselage skins up to $\frac{1}{8}$ -inch thick. It is claimed that



Lalli Stretch Forming Press with shell die

there is little or no tooling time involved, and elaborate preparations are not necessary, a make-up being all that is required. Doors and panels are said to be constructed to forty thousandths of an inch thick, stretched over dies 0.074-inch thick with the skins retaining structural strength.

According to the manufacturer, there is no limitation as to the size of the sheet as the machine can be made to any size or shape. Pyrometer thermostatic control, it is claimed, assures accuracy, forming pieces without distortion.

February, 1954

IT'S FAR SUPERIOR

COMPARISON PROVES IT



DON'T BUY ANY AIR GRINDER UNTIL YOU'VE GOT THE FACTS ABOUT THE "M-B" UTILITY *Pneumatic* GRINDER

MODEL U-TR
A 60,000 R.P.M. UNIT

A powerful, fast-cutting tool, streamlined in design, easy to handle. Designed for real production work and the toughest jobs. Precision made, excellent balance. Special grease-sealed bearings . . . no lubrication required. Fitted with steel housing, a special safety feature.

Also Other Grinders and Automatic Airline
Filters, Regulators and Lubricators.

"Remember, Built-in Quality Remains
Long After First-Cost Disappears"

Representatives in Principal Cities
Write for Literature

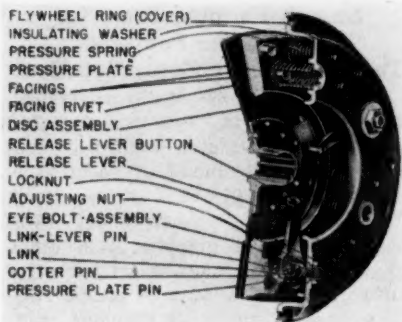
M-B PRODUCTS

46 Victor Ave.
DETROIT 3, MICHIGAN

MODERN MACHINE SHOP 359

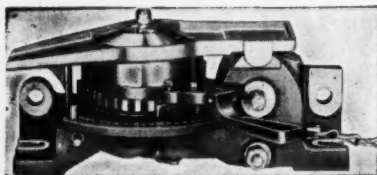
Non-Adjustable Clutch Features Dry-Disc Push-Type Construction

Lipe-Rollway Corp., Syracuse 1, N. Y., has announced the heavy-duty non-adjustable Lipe DP (Direct Pressure) Clutch, featuring a dry-disc push-type construction, which is designed to minimize periodic inspection, maintenance, and replacement deadlines. According to the manufacturer, the clutch provides for high torque capaci-



Cutaway view of Lipe DP (Direct Pressure) Clutch

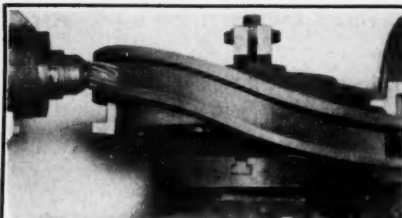
MODEL H AUTOMATIC Chuckling & Indexing Fixture



1. 1800 light cuts per hour.
2. Either horizontal or vertical position.
3. Collets changed instantly.
4. Automatically knocks piece out.
5. Ratchet or degree indexing — degree indexing added later if desired. Capacity 1".
6. Automatic indexer also added later. Model F—Both degree and ratchet indexing. Capacity up to 2 1/4".

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J. W. DEARBORN • Ansonia, Conn.



The Rowbottom Machine Co., Inc.

P. O. BOX No. 4097 • WATERBURY 14, CONN.

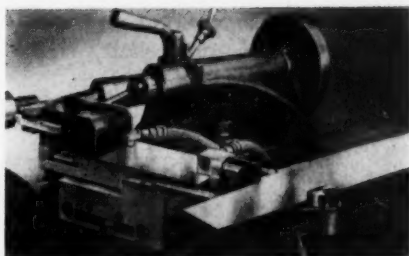


YEAR IN YEAR OUT

Make ROWBOTTOM your cam department.
OUR SPECIALIZED MODERN EQUIPMENT plus
50 years experience in CAMS can be yours.

Tracer Tool Is Adaptable to Medium Size Lathes

Identified as the Model M 1500, a profile tracing tool which is said to be a simple, compact, precision duplicating attachment adaptable to medium size lathes, such as those in the 16 to 24-inch size range, has been announced by Air Control Division of Lehigh Foundries, Inc., 1500 Lehigh Drive, Easton, Pa. The tool is all-mechanical, having no electronic or hydraulic mechanisms, and is mounted directly on the cross slide. According to the manufacturer, the tool has a horizontal slide operating between two rows of preloaded ball bearings, minimizing all slap and side play, and positive contact between the stylus and a 1/4-inch template is assured by air pressure applied to the tool through a pressure regulator and a four-way valve. A rotary stylus with positive wedge lock is utilized, thus permitting the cross feed screw to be set in one posi-

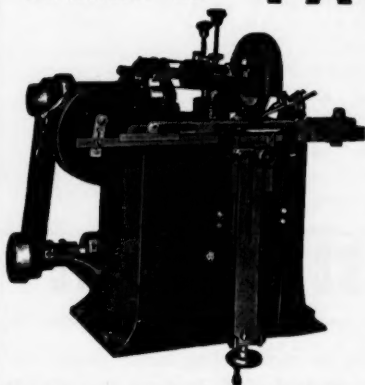


Lehigh Model M 1500 Tracer Tool mounted on lathe

tion and not moved while successive production workpieces are being machined.

The stroke of the tool is 4 inches, which is said to permit diameter changes of 8 inches to be turned, and 90-degree shoulders in the direction of feed can be turned either externally or internally. Facing is said to be accomplished by rotating the tracer tool so that it is perpendicular to the cross slide.

Combination Grinder EC



The only single unit grinder adaptable for hack, band and circular saws that does not depend on the shape of the grinding wheel to form the shape of the tooth. • This unique feature enables operator to grind a variety of blades without dressing or changing wheels.

PAYS for ITSELF

By sharpening just one gross of hack saw blades

This remarkable machine actually will resharpen one gross of hack saw blades six times, thus saving enough money to pay for itself.

E.C. Grinder does a "bang-up" job, giving saws a sharp long lasting edge that's actually better than new. This is because new blades usually are not ground after hardening. E.C. will neither burn nor anneal blades. E.C. also sharpens circular, band or hack saw blades.



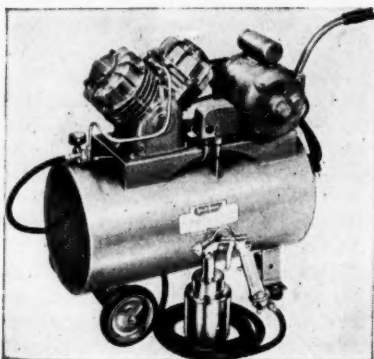
3803 Ridge Rd., Cleveland 9, Ohio

Maker of largest line of saw and tool sharpening machines

Portable Tank Sprayer Features Twin Compressor

W. R. Brown Corp., 2649 N. Normandy Ave., Chicago 35, Ill., has introduced a portable tank sprayer, designated as the Model 450, which features a twin compressor for providing ample power. The compressor is of the multiple-diaphragm type and is equipped with oversize ball bearings which are lubricated for the life of the bearings. The unit incorporates an 11½-

gallon heavy-welded steel air-storage tank which has an automatic pressure switch, starting the motor when the



Brown Model 450 Twin Compressor Tank Sprayer



THE TWO IN ONE

COMBINATION
ROTARY TABLE
AND
ANGLE PLATE

PRECISION
ACCURACY

WORM adjust-
able from
0 to 90
degrees.

VERNIER
control to
within

WRITE FOR FOLDER

2 seconds of Arc.

Makers of Helical Gear Speed Reducers.
Worm and Gear Speed Reducers. Stand-
ard and Special Gears. Wedge-Lock
Turret for Lathes and Turret Lathes.

Open territory available to representatives

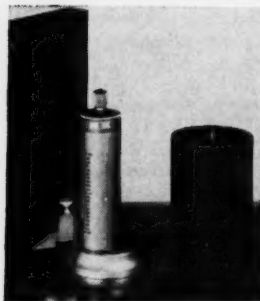
OLSON INDUSTRIAL PRODUCTS, INC.

40 W. WATER ST.

WAKEFIELD, MASS.

pressure drops to 30 lb. and shutting off when the pressure reaches 45 lb. A pressure gage indicates the operating pressure. According to the manufacturer, the twin compressors deliver four cubic feet of air per minute.

The complete unit is mounted on rubber-tired wheels which can be removed for stationary use. Rubber pads for the tank feet and a removable handle are supplied as standard equipment. A tire inflator chuck, 15-foot air hose, Brown No. 121 spray gun, and ½-h.p. 110-volt 60-cycle a. c. electric motor with a 10-foot cord and plug are also included.



MICRO-HEIGHT GAUGE

Nothing compares with it for fast and accurate layout and inspection.

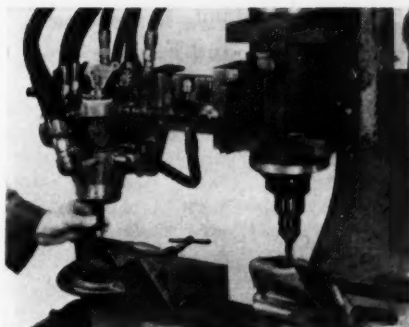
A precision built, satin chrome finished height gauge with direct capacities from zero at base to 3" in thousandths. It scribes, it measures center distances, makes fast and accurate inspections. Add our new 3" hardened, ground and lapped standard riser to extend range to 6". Write for prices.

Fairfield Gauge Co., 172 Herbert St., Bridgeport, Conn.

Unit Traces 360 Degrees in All Directions

For converting a miller or other accurate metal-cutting machines into a highly precision three-dimensional duplicator, True-Trace Sales Corp., 2303 Chico Ave., El Monte, Calif., has announced a hydraulic tracer, designated as the Model A-3D, which is said to be capable of tracing 360 degrees in all directions. Any combination of traverse, transverse, and vertical motion is simultaneously controlled by means of one tracer spindle. The tracer, it is claimed, can be made to follow a one-to-one ratio three-dimensional wood, plaster, or metal template easily. According to the manufacturer, the unit ensures tolerances of from 0.005 to 0.0005 inch to be held. Simple feed rate controls are said to enable the operator to make feed rate changes quickly.

Developed primarily for producing



True-Trace Model A-30 Hydraulic Tracer in use

high-precision unusually-contoured aircraft parts, the unit is also adaptable to practically all other industries as a converter for creating an all-purpose fast-production duplicating tool. Additional conversion material necessary includes hydraulic power unit, hydraulic cylinders, mounting brackets, and hydraulic lines and fittings.

**RAPID
SET-UPS:**

with extreme accuracy—every time and on the first try!

Brookfield
TOOL HOLDER



In Essence:
A Floating,
Precision Vise

One Brookfield Tool Holder = One Conventional Tool Holder + Stock of at least 100 Bushings.

- Adjustable V Jaw
- Axially True Design
- Balanced-Pressure Locking

No more fussing with bushings . . . just slip tool in jaw and tighten . . . run-out is less than .0001 per inch . . . Brookfield Tool Holders guarantee clean, easy, solid set-ups every time and on the first try! Models available for nearly all automatic and hand screw machines, turret lathes, radial drills, etc. Also useful as Adjustable Steady Rest and Work-Holder.

Write for fully descriptive brochure.

BROOKFIELD, INC. 172 Newbury St.
Boston 16, Mass.

FLEX-TIP*



BLOW GUNS 1/4" and 1/2"

- for split-second cleaning
- just flex nozzle to release air — from puff to blast
- finger-tip control

Lever and Button Types also available

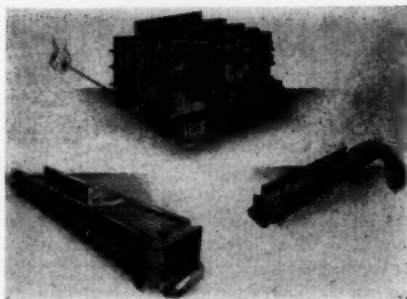
WRITE FOR CATALOG SHEET

Norgren
C. A. CO.

3435 So. Elati, Englewood, Colo.

Racks Store Wire in Compact, Accessible, and Easy-to-See Manner

Intended for use on assembly lines, racks, designated as "Wiracks," which are designed to store wire in a compact, accessible, and easy-to-see manner at all times have been announced by Stackbin Corp., 1083 Main St.,

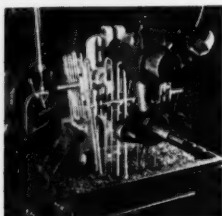


Stackbin "Wiracks"

Pawtucket, R. I. The racks, it is claimed, can be stacked as high as desired, either flush at the front or at an angle, locking one above the other. The racks can be quickly set up and taken down without the use of tools. Arranged at a work station, the racks can be loaded from the rear and individually adjusted to the desired depth without interrupting the flow of work or dismantling the setup. A raised lip on each end of the rack positions the wire for speedy selection by the operator and provides ample space for labeling purposes.

Made of heavy-gauge sheet steel and of all-welded construction, an individual rack measures 2½ inches wide x 2 inches high x 15 inches long and is finished in durable olive green baking enamel.

SAFETY ON MILLING MACHINES



New ENCLOSURE TYPE GUARD

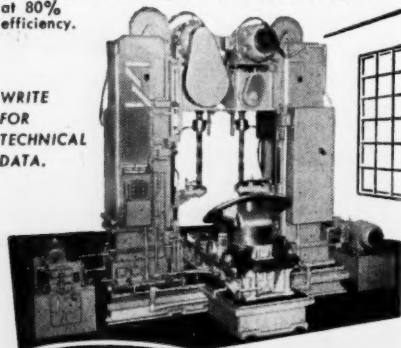
Protects OPERATORS HELPS SPEED PRODUCTION

Send For Literature

SEARJEANT METAL PRODUCTS, INC.
DEPT. M. MENDON, N. Y.

No. S.O. 4357: 2-Column, Deep Hole Hydraulic Drilling Machine equipped with two 25-H.P. "Drillmaster" Single Spindle Drills. PART: Gun Shield—Armour Steel. OPERATIONS: Drill pilot hole, Counterbore, Step Drill three holes through 14 inches of metal—2 holes simultaneously. PRODUCTION: One per hour at 80% efficiency.

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STANDARD MACHINE AND TOOL CO., LTD.
Representative:
WINDSOR, ONT.

New Center Building, Detroit 2, Mich.

KENNAMETAL CUTTING TOOLS

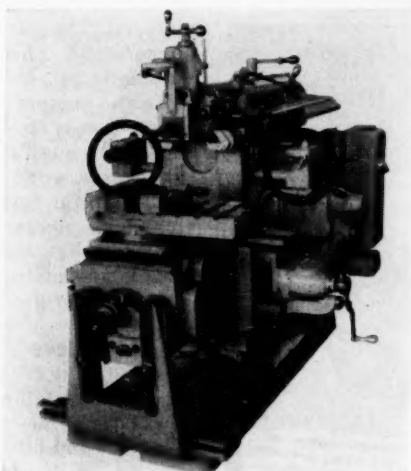
for Increased Productivity



KENNAMETAL Inc LATROBE, PA.
CEMENTED CARBIDE TOOLS,
BLANKS, MILLING CUTTERS

Dual-Control Available for Cincinnati Metal-Working Shaper

According to The Cincinnati Shaper Co., Cincinnati 25, Ohio, a dual-control is offered as an extra feature for the electro-magnetic brake and clutch on its metal-working shapers. The additional control is said to permit more efficient handling of large awkward work which obstructs the operator's view from the normal working posi-



Cincinnati Metal-Working Shaper equipped with dual-control

tion. The electro-magnetic clutch itself is standard equipment on Cincinnati shapers.

Other special features which have been added to the machine to further increase operator efficiency are automatic tool lifter, power down feed to the head with automatic stop, and an auxiliary front cross feed screw.

For further information on any product mentioned in this issue—use the **READER SERVICE CARDS** opposite page 404.



PRECISION BORING

WITH

MAXWELL MASTUR TOOLS

• Adjustable to 0.0002-inch, the new improved MASTUR boring tools feature precision, speed and long service life. New body and block construction permits these tools to take heavier cuts at higher speeds — to do more work in less time.

Adjusting-screw head is graduated into 50 divisions to provide readings in thousandths, and body is graduated to permit vernier readings of 0.0002-inch. The three models available have maximum boring bar capacities of 1/2, 3/4 and 1-inch and boring range from 3/8 to 15 inches.

952-MTC



Write for
catalog.

THE MAXWELL COMPANY

325 Broadway • Bedford, Ohio

Book reviews

Metallurgical Dictionary. By J. C. Henderson. Published by Reinhold Publishing Corp., 330 W. 42nd St., New York 36, N. Y. 396 pages. Cloth bind-

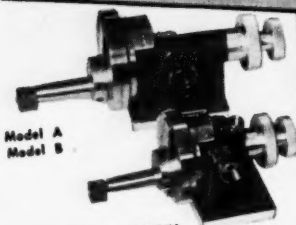
ing, board covers. Price, \$8.50.

Arranged specifically for the needs of all metal industries, this unusually complete reference book contains over 5,000 informative definitions and descriptions covering all the most essential terms in both production and physical metallurgy. Semi-encyclopedic in nature, the book has been selectively limited in scope so as not to encumber the user with an avalanche

of obsolete or widely remote material. The sole purpose of the volume is to provide a comprehensive, easy-to-use, thoroughly up to date working tool for all those who manufacture or use metals and metal products. Original definitions of a sizable number of terms are included, such as flame plating, shell molding, and others which have only very recently made their appearance.

Particular care has been taken to cross-reference entries of related terms, not only to facilitate reference to compound terms, but to direct the user from a synonym to a preferred term and to offer a full coverage of available information.

Improve Your Operating Efficiency, Quality and Profits with these LAST WORD Metal-Working Products!

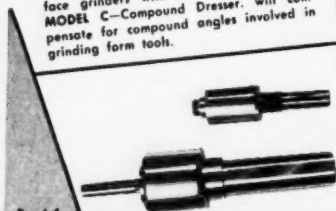


Model A
Model B

LAST WORD WHEEL DRESSERS FOR RADIUS AND TANGENT ANGLE DRESSING — AVAILABLE IN 3 MODELS
MODEL A—For grinders using wheels up to 20" dia MODEL B—For small model sur-
face grinders with 7" max wheel dia
MODEL C—Compound Dresser. will compensate for compound angles involved in grinding form tools.



SAMSON "Heavy-Duty" OFFSET BORING CHUCK—Has positive centering feature for drilling and milling operations. Complete accessories available.



Send for complete data

GRAY-GRIMES FLOATING DRIVER—For reaming, tapping, valve seating and similar operations. Can be supplied with standard or special shanks and adaptors.



GRAY-GRIMES AUTOMATIC STEADY-REST FOR O. D GRINDING—Permits grinding complete length of shaft maintaining constant pressure against work-piece as stock is removed.

Mfg'd by
Gray-Grimes Tool Co.



LAST WORD sales company

18500 MT. ELLIOTT (Dept. B) • DETROIT 34, MICH.

Welding Engineering. By Boniface E. Rossi. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N. Y. 786 pages. Illustrated. Cloth binding, board covers. Price, \$8.00.

This book is designed to familiarize the student or beginner with fundamental facts concerning welding, to give those in the welding field a wider understanding of the process, and to provide a useful source of reference for the draftsman, designer, engineer, researcher, executive, and others seeking information on welding and its applications. Treatment is technical and practical.

Section one covers various types welding processes, such as forge, resistance, thermit, gas, pressure gas, arc, submerged arc, inert-gas-shielded arc, atomic hydrogen, stud, induction, flow, and cold welding. Soldering, brazing, surfacing, metallizing, oxygen and

arc cutting of metals, and safe practices and health precautions are also covered.

Section two deals with metals, their metallurgy and visibility. Section three presents and discusses pertinent design and fabrication considerations, such as welded design and its field of application; types of joints, welds, and stress distribution; layer sequences, deposition rates, and welding costs; expansion, contraction, and residual stresses in welding structures, welding jigs; and standard symbols adopted by the American Welding Society and their use.

Section four fully covers the testing and inspection of welds. Five useful and important appendices are included: namely, welding terms and their definitions, selected bibliography, visual aids, questions and problems, and engineering data and talks pertaining to welding.

SHUSTER

Automatic

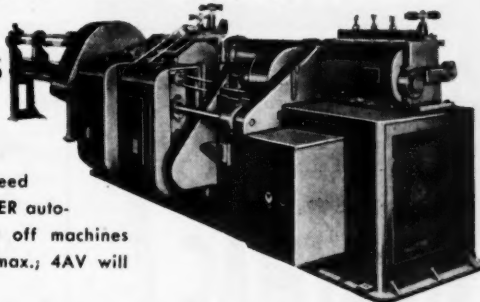
Since 1866

WIRE STRAIGHTENING
AND CUTTING MACHINES



THE **BIG** NEWS IN WIRE STRAIGHTENING
IS THE NEW "SHUSTER" Dual Control
3AV & 4AV
with INFINITE SPEEDS

Both the speed of feed, and the speed of cut off are individually controlled by separate variable speed units on each of these new SHUSTER automatic wire straighteners and cut off machines. No. 3AV handles wire $\frac{1}{2}$ " dia. max.; 4AV will take $1\frac{1}{16}$ " max.



METTLER MACHINE TOOL, INC.

Representatives in all principal cities and foreign countries.

32 Lawrence St.
New Haven, Conn.

Procedures in Experimental Metallurgy. By A. U. Seybolt and J. E. Burke. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 340 pages. Illustrated. Cloth binding, board covers. Price, \$7.00.

This book is designed to describe most of the important laboratory techniques which are now used in the preparation of metals and alloy specimens for further study. Investigational

techniques, such as microscopic examination, X-ray diffraction methods, thermal analysis, and mechanical testing are purposely omitted; however, there are satisfactory monographs on these subjects. The theme of the book is the preparation of metal samples up to the point of making observations on the properties of the metal. The steps from preparation or selection of the base metal to be used through principles of alloying, melting without contamination, casting, fabrication into rod, sheet, or wire, and heat treatment to obtain a desired structure are included.

Chapter headings are Methods of Obtaining High Temperatures; Measurement of High Temperatures; Control of Temperature; Refractories; Controlled Atmospheres; Vacuum Systems; Melting and Casting; Heat-Treating Techniques; Fabrication of Metals; Powder Metallurgy; Preparation of Pure Metals; and Preparation of Metal Single Crystals.

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**Leakproof—
Stays in place
For Coolants, Cutting
Oils, Solvents**

Made of steel with brass fittings — males, nozzles, stopcocks, etc., made in 1/8", 1/4", 3/8", 1/2", 3/4" I.D. Write for bulletin and prices.

VERMONT FLEXIBLE TUBING CO.
Lyndonville, Vermont

RAYMAC *Solid Carbide* DRILLS and REAMERS

Raymac drills cut hardened metal . . . do not burn or anneal. Feature operational speeds of 350 to 600 RPMs depending on size and hardness of metal.

Raymac solid carbide reamers are custom designed for individual jobs.

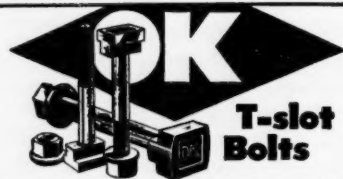
Write for catalog No. 12

RAYMAC

MANUFACTURING COMPANY INC.
3729 CASS AVENUE, DETROIT 1, MICH.

Stress Concentration Design Factors. By R. E. Peterson. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 155 pages. Illustrated. Spiral binding, board covers. Price, \$8.50.

It is the purpose of this book to place in the designer's hands information which will enable him to improve



The world's best . . . one-piece, drop-forged—not welded—of mild carbon steel, heat-treated, with head accurately milled for standard tables on lathes, planers, boring mills, milling machines. Integral washer and nut. Sizes: up to 30". Typical direct prices for 10" lengths: 1/2"—\$1.36, 3/4"—\$1.36; 1"—\$1.58; 1 1/4"—\$1.89. Write for price list.
THE O K TOOL COMPANY, INC., Milford 4, N. H.

his design calculations to the end that failure will be less prevalent and better-balanced designs will be achieved. The book should be regarded primarily as a working tool; it is not intended to be a textbook in the usual sense, and therefore only enough background and references are given to enable the reader to explore the subject further if he so desires. Features have been incorporated into the book to increase its usefulness to designers—an "edge finder," helical binding, and large full-grid charts.

Temperature Measurement in Engineering, Vol. I. By H. Dean Baker, E. A. Ryder, and N. H. Baker. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 179 pages. Illustrated. Cloth binding, board covers. Price, \$3.75.

This book, the first of two comprehensive volumes, discusses temperature in terms of engineering measurement. All the facts needed to design, construct, and operate an effective temperature measurement installation are presented, as well as information on how to apply these facts in general practice for actual measurement situations that might arise. In effect, the book provides a list of the techniques to be employed, the proven methods of analysis, a survey of previous designs, the specific information required for feasibility of execution, and an extremely well-developed procedure of general applicability. The types of conditions encountered in producing satisfactory temperature-measurement designs are classified on a physical basis in this work, such as interior points in solids, liquids, gases, and flames. In addition to outlining an unusual classification of temperature-measurement problems, the book includes a full listing of the various types of temperature-measuring instruments.

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MODEL N

ROTARY STEEL STAMPS

Single Wheel



3 Rotary Stamps do away with 40 single Hand Stamps. Changes of characters are quickly made merely by rotating the Type wheel.

FIGURE ROTARY STAMP

1 2 3 4 5 6 7 8 9 0 X —
(all on one wheel)

furnished in leatherette case.

LETTER ROTARY STAMPS

A B C D E F G H I J K L M &
(on wheel of one stamp)

N O P Q R S T U V W X Y Z —
(on wheel of other stamp)

PRICES

Size	Figure Stamp One Shank One Wheel	Letter Stamps Two Shanks Two Wheels	Letter and Figure Set Three Shanks Three Wheels
1/16	\$8.00	\$24.00	\$32.00
3/32	8.00	24.00	32.00
1/8	8.00	24.00	32.00
5/32	8.00	24.00	32.00
3/16	8.00	24.00	32.00
1/4	10.00	30.00	40.00
5/16	14.00	42.00	56.00
3/8	16.00	48.00	64.00

NUMBERALL STAMP & TOOL CO.

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Industrial Inorganic Analysis. By Roland S. Young. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 368 pages. Cloth binding, board covers. Price, \$5.75.

Written for chemists in the mining and metallurgical field, this book consists of 31 chapters, each of which covers an individual metal or group of metals. In addition, there are chapters on cyanogen, boron, calcium, carbon,

chlorine, fluorine, nitrogen, oxygen, phosphorus, silicon, and sulphur. Dealing with both theory and practice for all of these properties, the book includes information on analytical procedures, gives separations necessary in complex samples, provides hints in manipulative technique, and assesses the value of methods for universal and specialized work. A special section of the book covers miscellaneous analyses and data. Material on the acidity of special samples, gas analyses, water, xanthates, and standard acids, bases, and indicators is included.

Job Evaluation Manual. Published by John Marshall Associates, P. O. Box 2463, Bridgeport, Conn. Price, \$7.50.

Of interest to those plants which cannot afford engineering talent to evaluate jobs or determine rate ranges, this manual is written so that an inexperienced person can easily grasp the fundamentals of job evaluation and install the right person at the qualified wage rate for each department. The manual deals with the following primary factors under general groupings: physical and mental skill; physical and mental effort; responsibility; working conditions; judgment, initiative, and ingenuity; education; experience; supervision; safety; contacts; errors; accidental risk; health hazards; job levels with assigned score ranges; job evaluation and description chart; and departmental check sheet.

Farm Arc Welding. By V. J. Morford. Published by The James F. Lincoln Arc Welding Foundation, Cleveland, 17, Ohio. 456 pages. Illustrated. Bound in semi-flexible board, covered with gold-embossed simulated leather. Price, \$2.00 in U.S.A., \$2.50 elsewhere.

This book provides plans, bills of



How easy can you get? If you can hold a wrench and a screw-driver you can put a new seat in a SMITH'S REGULATOR in just a few minutes time. No special tools—no special skills—no long delays. That's why experienced welders pick SMITH'S REGULATORS.

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materials, and suggestions for a wide variety of farm projects in relation to welding. The contents are divided into two principal parts. Part I covers such subjects as the place of the arc welder on the modern farm, using the farm welder, planning and equipping the farm shop, and suggested procedure in welding and cutting. Part II deals with the repair, alteration, and construction of farm equipment, including post-hole diggers; manure loaders and spreaders; snow and earth moving equipment; tillage and fertilizer handling equipment; mowing and forage handling equipment; planting, seeding, and seed processing equipment; harvesting and crop processing equipment; disease and pest control equipment; elevators; loaders; conveyors; livestock and dairy equipment; poultry equipment; power saws; and various other equipment.

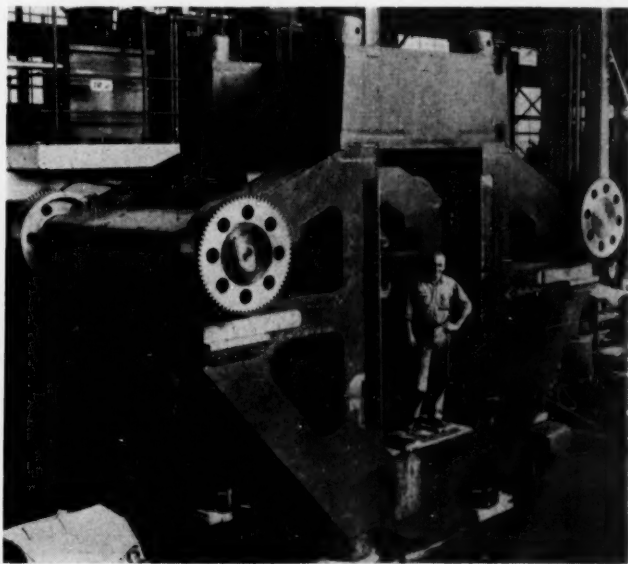
Vertical Chucking Grinder Film

A silent motion picture on its vertical chucking grinder has been released by The Bullard Co., Bridgeport 2, Conn. The 16-mm. film is in black and white and has a running time of approximately 12 minutes. It shows the precision, flexibility of control and safety design of the machine and demonstrates that the machine possesses the efficiency to meet present day requirements for grinding the larger sizes of work. The film is available on free loan by request to the advertising department of the company.

For further information on any product mentioned in this issue—use the **READER SERVICE CARDS** opposite page 404.

Saddle for Tube Reducer

SHOWN here is the saddle for what is believed to be the world's largest tube reducing machine. Fully assembled with dies, rolls, roll neck bearings, and other parts, the saddle will have a gross weight of 150 tons. The tube reducer, constructed by E. W. Bliss Company for the Tube Reducing Corp., Wallington, N. J., will be used in a new cold finishing process which will produce compression formed precision tubing.



new literature

1. Curved-Tooth Milling Cutters. Aber Engineering Works, Inc., Waterford, Wis., has released a catalog describing and illustrating its curved-tooth milling cutters.

2. Pressroom Equipment. Durant Tool Supply Co., 155 Orange St., Providence 3, R. I., has issued a catalog covering its line of pressroom equipment.

3. Shop Stools and Chairs. Standard Pressed Steel Co., Box 556, Jenkintown, Pa., has issued a bulletin (No. 704-4) illustrating and describing 14 steel stool models.

4. Reciprocating-Table Surface Grinders. A brochure, prepared by Reid Brothers Co., Inc., Beverly, Mass., describes and illustrates its line of 6 x 18-inch reciprocating-table surface grinders.

5. Heavy-Duty Needle Bearings. The Torrington Co., Bantam Bearings Division, South Bend 21, Ind., has issued a catalog (No. 61) describing its heavy-duty needle bearings.

6. Tool Grinders. Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich., has released a bulletin (No. 46337) describing and illustrating its tool grinders which are designed for the efficient sharpening of single-point tools.

7. British - American Unified Thread Standards. Besly-Welles Corp., 108 Dearborn Ave., Beloit, Wis., has issued a new edition of its tap reference booklet containing the latest information on British-American Unified Thread Standards. The booklet provides a practical, easy-to-understand explanation of the new standards for internal threading.

8. Boring, Facing, Threading, and Recessing Tools. R. B. Tool Co., Inc., 783 N. Broadway, White Plains, N. Y., has released a catalog describing its boring, facing, threading, and recessing tools.

9. Abrasive Snagging Wheels for steel mills and foundries are described and illustrated in a catalog released by Simonds Abrasive Co., Philadelphia 37, Pa. The catalog contains grinding wheel recommendations for various materials.

10. Coolant Filters. Industrial Filtration Co., Lebanon, Ind., has issued a folder describing and illustrating Del-park Coolant Filters which are designed for use on Besly grinding machines.

11. Granite Surface Plates. Taft-Peirce Mfg. Co., Woonsocket, R. I., has released a catalog (No. 510) describing and illustrating its line of granite surface plates.

12. Fume Exhausters. Ten Torit Exhausters, ranging in capacity from 350 to 4,000 c.f.p.m. and designed to remove fumes, odors, gasses, and so on from industrial operations, are fully described in a folder issued by Torit Mfg. Co., 296 Walnut St., St. Paul 2, Minnesota.

13. Pivoted-Blade Power Shears. The Cleveland Crane & Engineering Co., Wickliffe, Ohio, has released a catalog (No. 2011-E) which provides dimensions and specifications for 31 different sizes of shears in its regular line.

14. Broaching Troubles and Gear Shaving Check Points. A wall card listing broach troubleshooting and gear shaving check points has been issued by National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Michigan.

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15. **Automatic Presses.** D1 Machine Corp., 2714 W. Irving Park Rd., Chicago 18, Ill., has available a catalog descriptive of Diebel Precision-Built Automatic Presses.

16. **Straightening Presses.** "Flexible-Power" presses, accessories, and straightening attachments are described and illustrated in a bulletin (No. 401) released by General Mfg. Co., 6433 Farnsworth Ave., Detroit 11, Michigan.

17. **"Symposium on Electro-Magnetic Relays"** is the title of a brochure, published by Potter & Brumfield, Dept. MS, Princeton, Ind., containing papers selected from those given at the two-day Symposium on Electro-Magnetic Relays at Oklahoma A&M College, Stillwater, Oklahoma.

18. **Laminate Plastic Anchor Bushing Templates.** The Hi-Shear Rivet Tool Co., 8924 Bellanca Ave., Los Angeles 45, Calif., has issued a bulletin describing how to make laminate plastic anchor bushing drill templates.

19. **Power Transmission Equipment.** Chicago Die Casting Mfg. Co., 2510-14 W. Monroe St., Chicago 12, Ill., has issued a catalog (No. 54A) which describes and illustrates its line of power transmission equipment.

20. **Carbide Reamer Sharpening.** A shop manual has been issued by The Staples Tool Co., Cincinnati 25, Ohio, to provide valuable data on carbide reamer sharpening and tool conditioning.

21. **Collets and Chucks.** Rivett Lathe & Grinder, Inc., Dept. MMR, Brighton 35, Boston, Mass., has issued a bulletin (No. 100E) describing and illustrating its line of collets and chucks.

22. **Mounting Pads.** A booklet describing the use of "Unisorb" mounting pads has been published by The Felters Co., Unisorb Dept., 210 South St., Boston 11, Massachusetts.

23. **Tracer-Guided Engraving Machines.** A catalog issued by New Hermes Engraving Machine Corp., 13-19 University Place, New York 3, N. Y., describes the industrial application of various models of its tracer-guided engraving machines.

24. **Reamers.** A four-page two-color bulletin (No. 563) released by Pratt & Whitney, Division Niles Bement-Pond Co., 25 Charter Oak Blvd., West Hartford 1, Conn., describes and illustrates its line of "Blue Helix" Reamers.

25. **Cutting and Grinding Fluid Selector.** D. A. Stuart Oil Co., Ltd., 2741-47 S. Troy St., Chicago 23, Ill., has released a folder which contains a Stuart's Cutting and Grinding Fluid Selector, a Stuart's Dilut-O-Graph, and instructions for using each of the selectors.

26. **A. C. Motor Frame Selection Chart.** A selection wall chart which shows the comparison between "old" and "new" N.E.M.A. standard dimensions for a. c. motors from 1 to 30 h.p. has been issued by Westinghouse Electric Corp., 401 Liberty Ave., Box 2099, Pittsburgh 30, Pa.

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February, 1954

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27. "Better Grinding," book released by Landis Tool Co., Waynesboro, Pa., provides valuable tips on how to set up grinding jobs, how to operate precision cylindrical grinders, how to take proper care of cylindrical grinders, and how to turn out better grinding jobs.

28. Carbide Tool Grinding Units. A four-Sterling Abrasives Division of The Cleveland Quarries Co., Tiffin, Ohio, describes and illustrates two types of carbide tool grinding units.

29. Machine Tool Attachments and Accessories. A two-color bulletin (No. 5321-CD) released by South Bend Lathe Works, 425 E. Marison St., South Bend 22, Ind., describes and illustrates 165 attachments and accessories for machine tools.

30. Positive Drive. Howe & Fant, Inc., 542 Flaxhill Rd., S. Norwalk, Conn., has issued a bulletin (No. 5312) which explains the "Flying Dutchman" positive drive, now incorporated in all Model "E" Lign-o-matic drill press turrets.

31. Surface Roughness Measurement. Micrometrical Mfg. Co., 345 E. Main St., Ann Arbor, Mich., has released a bulletin (No. LT87) describing its Profilometer Type QA Amplimeter.

32. Bench-Type Mills with three-way hand-lever travel are described and illustrated in a bulletin issued by Barker Engineering Co., 500 Green Rd., Cleveland 21, Ohio. Line drawings and specifications are included.

33. Metal Hose. Flexonics Corp., 1373 S. Third Ave., Maywood, Ill., has released a catalog (No. 130R) describing all types of Flexon Metal Hose.

34. Honing Equipment. A catalog released by Micromatic Hone Corp., 8100 Schoolcraft Ave., Detroit 38, Mich., describes its line of honing machines and equipment.

35. Hydraulic Components. A set of nine catalogs which are designed to simplify planning of hydraulic circuits and ordering of hydraulic components have been issued by The Hydraulic Press Mfg. Co., Mount Gilead, Ohio. Each catalog features a visual index showing an illustration of the product and the page where specifications are to be found. Large cut-away views shows construction features and clearly identify parts for ordering replacements.

36. Lathe Chucks. De Witt Equipment Co., 136 Lafayette St., New York 13, N. Y., has issued a bulletin providing complete specifications on a line of lathe chucks.

37. Hydraulic Presses and Equipment. R. D. Wood Co., Public Ledger Bldg., Independence Square, Philadelphia 5, Pa., has issued a catalog on its line of hydraulic presses and equipment.

38. Precision Instruments. A general catalog (No. 106) released by Chicago Dial Indicator Co., 180 N. Wacker Drive, Chicago 6, Ill., describes its Geneva line of precision instruments for checking.

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39. Broaching. "Broaching Automotive Castings at 200 Feet per Minute" (Publication M-1821) has been issued by The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

40. Steel Fabrication. A 12-page two-color bulletin released by The AR Welding & Fabricating Co., Cincinnati 17, Ohio, provides data on the company's services.

41. Bar Horizontal Boring and Facing Machines. Two basic types of bar horizontal boring and facing machines are described and illustrated in a bulletin issued by Simmons Machine Tool Corp., 1721 N. Broadway, Albany 1, New York.

42. Hole Punching System. A catalog (No. MH) published by Wales-Strippit Corp., 345 Payne Ave., North Tonawanda, N. Y., fully describes and illustrates the Wales Multiple Hole Punching System.

43. Tool Block and Toolholders. A six-page two-color folder issued by Marvic, Inc., 350 Peninsular Ave., San Mateo, Calif., describes the Lathemaster 4-Faced Tool Block and Instant-Change Toolholders.

44. Slings. The Cambridge Wire Cloth Co., Cambridge, Md., has released a 20-page catalog which describes and illustrates its "Gripper" slings.

45. Cutting Fluid. A three-color folder released by Master Chemical Corp., 13 Huron St., Toledo 1, Ohio, fully describes "Trim," a cutting fluid developed especially for modern machine tools.

46. Cemented Carbide Products. Kennametal Inc., Latrobe, Pa., has issued a catalog (No. 54) providing complete specifications and net prices of its line of tools and other products.

47. Automatic Screw Machine. A bulletin published by The Cleveland Automatic Machine Co., Cincinnati 12, Ohio, describes and illustrates its 2½-Inch Model "AW" Single-Spindle Automatic.

48. Optical Projection Comparator. Optical Gaging Products, Inc., 26 Forbes St., Rochester 11, N. Y., has released a bulletin describing and illustrating the AQ Optical Projection Comparator.

49. Gages. Size Control Co., 2500 W. Washington Blvd., Chicago 12, Ill., has released a condensed catalog (No. C-53) covering its line of gages.

50. Broaching Equipment. Data on each of its 12 basic types of machines are provided in a catalog (No. 877) released by Colonial Broach Co., P. O. Box 37, Harper Station, Detroit 13, Michigan.

51. Socket Wrench Sets. The Billings & Spencer Co., Hartford 10, Conn., has released a two-color catalog-type folder providing information on the ¼, ⅜, ½, and ¾-inch sockets and handle parts which are drop forged and packed in metal boxes of various sizes.

52. Horizontal Disc Grinders for grinding all kinds of castings and weldments are described and illustrated in a catalog (No. H-52) published by Gardner Machine Co., Beloit, Wisconsin.

53. Milling Cutters. A catalog issued by The DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill., describes a complete selection of cutters for milling machines.

54. Gear Speeders. Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich., has released a four-page bulletin (No. MS-10) which describes and illustrates its complete line of gear speeders.

55. "Design Guide for Custom-Built Cord Sets," a 12-page bulletin (No. CS-1) issued by Whitney Blake Co., New Haven 14, Conn., illustrates the standard molded parts available.

56. Surface Plates, Floor Plates, Surface Plate Equipment, and Work Benches are described and illustrated in a catalog (No. 838) released by The Challenge Machinery Co., Grand Haven, Michigan.

57. Coolant Spout. Vermont Flexible Tubing Co., Lyndonville, Vt., has issued a bulletin describing and illustrating the "Sealflex" Coolant Spout which bends and stays put in any position.

58. Filtration Equipment. Honan-Crane Corp., 682 Wabash Ave., Lebanon, Ind., has prepared two case histories telling how Honan-Crane filtration equipment has solved coolant clarification problems.

59. Carbide and High-Speed Steel Tools. M. A. Ford Mfg. Co., 744 W. River St., Davenport, Iowa, has issued a new price list on its carbide and high-speed steel tools.

60. Heating Elements. Norton Co., Worcester 6, Mass., has released a booklet (No. 146) fully describing its "Hot Rod" "Cristolon" Heating Elements.

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metalworking news in brief

To concentrate its nationwide services, Carboloy Department of General Electric Co., Detroit, Mich., has organized three new field districts; namely the Allegheny District, Pittsburgh, with **C. W. Powell** in charge; the South Central District, St. Louis, headed by **J. D. Kennedy**; and the New England District, Boston, with **H. H. Jason** in charge.

— o —

Kurt Orban Co., Inc., New York, N. Y., has formed a Canadian affiliate, **Kurt Orban Canada, Ltd.**, 2490 Eglington Ave., W., Toronto, Ontario, Canada, for the distribution of metals, machine tools, dry kilns, and steel mill products imported from Germany. **Gunther Kneidel** has been appointed commercial manager.

— o —

W. C. Sheers, formerly manager of service and quality control, has been appointed plant manager of **Standard Horse Nail Corp.**, New Brighton, Pa. **O. J. Molter**, former superintendent, will be associated with Mr. Sheers as time estimate and process consultant.

— o —

David Reid, Jr., has been appointed manager, abrasive and bond plants, at **Norton Co.**, Worcester 6, Mass., replacing **Albert E. Hall** who recently retired. **Robert G. Clark**, formerly assistant superintendent, succeeds Mr. Reid as superintendent of the abrasive and bond plants.

Allegheny Ludlum Steel Corp., Pittsburgh, Pa., has announced the appointment of **Dr. Rush A. Lincoln** as chief metallurgist. Dr. Lincoln was formerly manager of sales development and engineering service.

— o —

Speedgrip Chuck, Elkhart, Ind., has announced that its representative, **The Donald B. Huntting Co.**, 7446 Vine St., Cincinnati 16, Ohio, has opened an office at 1904 Brown Street in Dayton, Ohio. Lee Weber will be in charge of the Dayton office.

— o —

Hy-Pro Tool Co., New Bedford, Mass., has announced the appointment of **William A. Carlson** as its direct factory representative in the western New York and northern Pennsylvania area. Mr. Carlson will make his headquarters in Rochester, New York.

— o —

Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford, Conn., has announced the relocation of its Los Angeles branch office in new, larger quarters at 3016 E. Olympic Blvd., Los Angeles 23, Calif. The new office is under the management of **Daryl W. Callen**, district manager, and will include **P. D. Brown** and **Clifton S. L. Ek**, machine tool sales engineers; **Victor Stanley** and **Howard A. Small**, cutting tool and gage sales engineers; **Robert W. Conran**, **Kellerflex** sales; and **R. C. Loscy**, office sales.

Metal-Working News in Brief

Brown & Sharpe Mfg. Co., Providence 1, R. I., has announced the appointment of **Willard H. Spence** as assistant to the vice president of sales, in which capacity he will assist in general administration of the sales division. **Earl P. Leeds** has been named general sales director of domestic machine tool sales and will be generally responsible for the sale of machines and accessories to all domestic agents, customers, and the Government. **James Meehan**, sales director, has assumed direct responsibility for domestic milling machine sales in addition to domestic grinding machine sales.

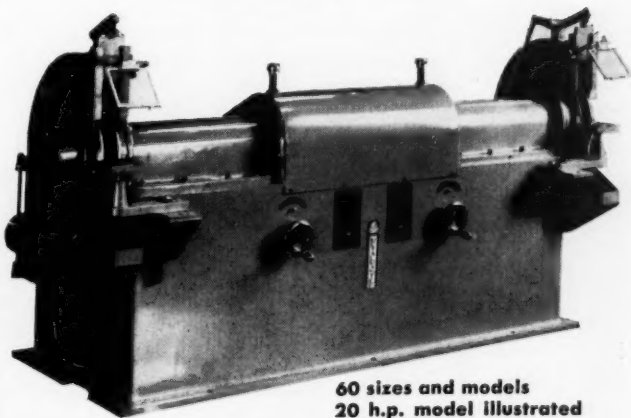
— o —

Adamas Carbide Corp., Harrison, N. J., has announced the appointment of **E. W. Keir Co.**, 2201 W. Clybourn St., Milwaukee 3, Wis., as sales representative for Wisconsin; **C. W. Davidson Co.**, 406 N. Illinois St., Indianapolis 4, Ind., as sales representative for Indiana; and **D. A. Olson Co.**, 7306 55th Ave., N. E., Seattle 5, Wash., as sales representative for Washington and Oregon.

Crucible Steel Company of America, Pittsburgh, Pa., has announced the appointment of **George F. Groff** as controller and **Daniel A. Porco** as assistant controller. In his new position, Mr. Groff will have direct responsibility for the management of the finance division. As an assistant controller, Mr. Porco will continue liaison work between the sales division and the finance division, as well as being available for special assignments.

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Metal-Working News in Brief

Horton Chuck, Division of The E. Horton & Son Co., Windsor Locks, Conn., has announced that its representative, The Donald B. Hunting Co., 7446 Vine St., Cincinnati 16, Ohio, has opened an office in Dayton, Ohio, at 1904 Brown Street. Lee Weber will be in charge of the Dayton office.

— o —

Dr. Adolph J. Lena has been appointed associate director of research at Allegheny Ludlum Steel Corp., Pittsburgh 22, Pa. Dr. Lena will be in charge of the physical metallurgy section of the research department.

— o —

The Hydraulic Press Mfg. Co., Mount Gilead, Ohio, has announced the appointment of Ralph H. Behrend as manager of its C-frame press sales. Mr. Behrend was formerly superintendent of the tooling division of Denison Engineering Company.

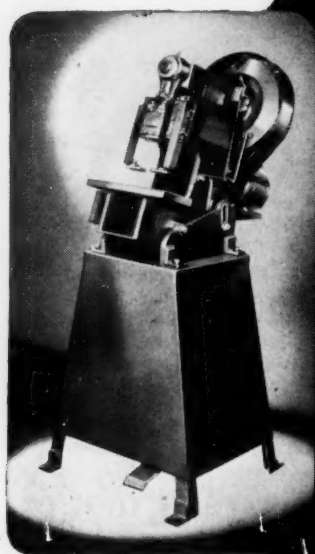
Kennametal Inc., Latrobe, Pa., has announced the appointment of George B. Varner as advertising manager of its industrial tools division, succeeding Fred W. Pennington who has retired. Mr. Varner was formerly associated with Westinghouse Electric Corporation.

— o —

The R. K. LeBlond Machine Tool Co., Cincinnati, Ohio, has announced the appointment of Connell Machinery Co., Toledo, Ohio, as sales representative in northwest Ohio. The new representative will offer the complete line of LeBlond lathes and lathe attachments.

— o —

The appointment of Dr. Matthew W. Miller as technical director of the coated abrasives and related products division has been announced by Minnesota Mining & Mfg. Co., St. Paul 6, Minn. Dr. Miller was formerly business manager of 3M's central research department.



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Metal-Working News in Brief

Five personnel changes reflecting company expansion in the metal-working lubrication field have been announced by S. C. Johnson & Son, Inc., Racine, Wis. **Ray Shimming** will be in charge of a product information service for industrial coolants and lubricants; **John A. Werner**, engineer, will instruct in the new Johnson Wax lubricant school; and **J. P. Mullenix** will handle technical service work on industrial metal-working products. In advertising, **W. Paul Sawyer** has been promoted to industrial advertising and sales promotion manager and will be assisted by **Richard W. Solon**.

— o —

The appointment of **W. H. C. Berg** as director of standards and research has been announced by Hanson-Whitney Division of Whitney Chain Co., Hartford 2, Conn. Prior to joining Hanson-Whitney, Mr. Berg had been engaged for more than 30 years in metallurgical research and engineering development work relating to machine tools and mechanical power transmission products.

C. W. Powell, manager of the Pittsburgh branch sales office of Carboloy Department of General Electric Company, has been named manager of the newly-created Allegheny district, with offices located at 704 Second Ave., Pittsburgh, Pa. **William S. Baker**, manager of the firm's east central district sales headquarters in Cleveland, has been named manager of tool sales, working out of Carboloy's main office in Detroit.

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Metal-Working News in Brief

Howard A. Reinhart, active for the past 15 years in both design and sales in the materials handling field, has become associated with the Ohio Equipment Co., 1220 W. 9th St., Cleveland, Ohio, representing such firms as Economy Engineering Company, Rack Engineering, Powell Pressed Steel Company, Thomas Truck & Caster Company, Harry J. Ferguson Company, and others.

— o —

Barnes Drill Co., Rockford, Ill., has announced the appointment of **Curtis I. Kahler** as honing equipment sales engineer to cover the Midwest and Eastern territories. Mr. Kahler will maintain offices at 6560 Epworth Blvd., Detroit, Michigan.

— o —

The appointment of **Jack L. Mustard** as assistant general sales manager, Industrial Division, has been announced by **Ex-Cell-O Corp.**, Detroit, Mich. Mr. Mustard will act as general assistant to the vice president of industrial sales and will work with both local and field representatives.



Lawrence A. Gerber has joined the sales engineering staff of **Honan-Crane Corp.**, Lebanon, Ind. With headquarters in Dayton, Ohio, Mr. Gerber will cover southwestern Ohio, southeastern Indiana, and eastern Kentucky.

— o —

Wilfred Ruffley, supervisor of general accounting and payrolls at **Carboloy Department of General Electric Co.**, Detroit, Mich., has been named manager of the newly-established factory accounting group. **Theodore P. Witkowski**, formerly a chemistry instructor in the Grand Rapids, Michigan, area, has joined Carboloy as an engineer in the metallurgical process and quality control unit for permanent magnet materials and the Edmore, Michigan, plant.

— o —

Walter B. Templeton, founder and formerly chairman of the board of **Templeton, Kenly & Co.**, Broadview, Ill., died recently at the age of 81 years. Mr. Templeton formed the jack manufacturing company in 1899 with the late **W. K. Kenly**.

— o —

Howard and Smith, Incorporated, Detroit distributor of machine tools, has announced the transfer of its general offices, display rooms, and warehouse to 22524 Woodward Ave., Detroit 20, Michigan.

— o —

Supreme Products, Inc., Chicago, Ill., has announced the appointment of **George W. Steinmetz** as sales manager of the chuck division.

— o —

The election of **George L. Guymon** to the board of directors has been announced by the **Industrial Filtration Co.**, Lebanon, Ind. Mr. Guymon, vice president and director of sales for the company's **Delpark** industrial filters, is well-known in the industrial filtration field, having introduced the **Delpark** automatic filter to the trade in 1950.

Metal-Working News in Brief

Leon P. Disinger, formerly vice president and sales manager of Buckeye Brass & Mfg. Co., Cleveland, Ohio, has announced the formation of an engineering and sales organization, known as **Leon P. Disinger & Associates** with headquarters at 3383 Chelsea Drive, Cleveland 18, Ohio. According to Mr. Disinger, the new engineering and sales service is specializing in the entire casting field and represents a select group of highly reputable companies having many years of experience in the foundry and machining fields.

— o —

Thor Power Tool Co., Aurora, Ill., has announced the appointment of **Ernest D. Fischer** as manager of its new factory branch office in Atlanta, Georgia. Mr. Fischer was formerly a service engineer in the Birmingham, Alabama, territory.

— o —

Allegheny Ludlum Steel Corp., Pittsburgh 22, Pa., has announced the appointment of **Louis B. Polen** as plant manager of the company's Buffalo foundry, succeeding **R. J. Bryan** who has

retired. The company has also announced that **William J. Baldwin** has been appointed west coast technical representative, under the direction of **R. J. Swan**, regional manager, with headquarters in Los Angeles. **Richard P. Stemmler** will succeed Mr. Baldwin as assistant plant manager at the company's Watervliet, New York, facility, and **Donald J. Robertson** will replace Mr. Stemmler as general superintendent of the Los Angeles forge.

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THE WELDON TOOL COMPANY

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Metal-Working News in Brief

John Gilchrist, former president of a company manufacturing power tools, has been named an officer and managing director of **Ex-Cello-O Corporation of Canada, Limited**. The new firm, with a plant in London, Ontario, is a subsidiary of **Ex-Cell-O Corp.**, Detroit.

— o —

The appointment of **Ira S. Latimer Co.**, 10600 Puritan Ave., Detroit 38, Mich., as representative of the Steel Division has been announced by **Henry Disston & Sons, Inc.**, Philadelphia 35, Pa. The company will represent **Disston** in eastern Michigan and northwestern Ohio.

— o —

Bausch & Lomb Optical Co., Rochester, N. Y., has announced the appointment of **The DoAll Company** as exclusive sales representative for its line of contour measuring projectors,

toolmakers' microscopes, stereomicroscopes, shop microscopes, and Brinell microscopes on a dealership basis.

— o —

The appointment of **Harold F. Larson** as general office manager has been announced by **Minnesota Mining & Mfg. Co.**, St. Paul 6, Minn. Formerly St. Paul office manager, Mr. Larson will now be responsible for all office management functions of the parent company and its domestic subsidiaries.

— o —

Smith Welding Equipment Corp., Minneapolis 14, Minn., has announced the appointment of **Russell Dahlnier** of Minneapolis as factory representative in the State of Iowa. Mr. Dahlnier will make his headquarters in Cedar Rapids.

— o —

Kennametal Inc., Latrobe, Pa., has announced the appointment of the following sales representatives: **Warren Eisenberg** in the St. Louis district; **Raymond Guenther** in the southern district; and **Robert Welch** in the New England district.

— o —

Albert B. Ross, 1288 Westmount Rd., S.W., Atlanta, Ga., has been appointed assistant representative in the southeastern territory by **The Henry G. Thompson & Son Co.**, New Haven, Connecticut.

— o —

Rahn Granite Surface Plate Co., Dayton, Ohio, has announced the appointment of **Sterling Sales, Inc.**, 787 Main St., Worcester 3, Mass., as its exclusive distributor in New England for its line of black granite surface plates, angle plates, parallels, and straightedges.

— o —

Kenneth H. Flory has been appointed purchasing agent of **Flexonics Corp.**, Maywood, Ill., succeeding **R. E. Anderson** who has retired.

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Metal-Working News in Brief

Mettler Machine Tool, Inc., New Haven, Conn., has announced that its New York sales office shall be known as **Mettler Machine Tool, Inc.**, 11 Broadway, New York 6, New York.

— o —

Charles R. Bender has been appointed secretary of the National Tool & Die Manufacturers Association, Cleveland, Ohio. In his new post, Mr. Bender will be chiefly responsible for membership work.

— o —

Size Control Co., Division of American Gage & Machine Co., Chicago, Ill., has announced the appointment of **Bert Lewyn** as its representative in Georgia, Alabama, Florida, and the eastern half of Tennessee. Mr. Lewyn's headquarters will be at 770 Virginia Circle, N.E., Atlanta, Georgia.

Rivett Lathe & Grinder, Inc., Boston, Mass., has announced the appointment of **Flicke Engineering & Supply Co.**, 305 Pattie Ave., Wichita 7, Kansas, as representative in the Kansas area for its line of air and hydraulic valves and cylinders and power units.

— o —

Tamms Industries, Inc., Chicago, Ill., has announced the appointment of **Thomas R. Nugent** as sales representative in Florida. Mr. Nugent will handle Tamms' line of raw materials for paint, varnish, and abrasive and feedstuff production.

— o —

Cleveland Industrial Tool Co., Inc., Cleveland 17, Ohio, has announced the appointment of **J. T. Moneith**, 1074 Farmington Ave., West Hartford, Conn., as factory representative for the states of Connecticut and Rhode Island.

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MASSILLON, OHIO

Metal-Working News in Brief

E. W. Bliss Co., Canton, Ohio, has announced the appointment of **R. O. Willoughby** as superintendent of ordnance for its Canton plant. Mr. Willoughby was formerly a monitor for the Air Force's heavy press program.

— o —

Cone-Drive Gears Division, Michigan Tool Co., Detroit, Mich., has announced the appointment of **Transmission Engineering Co., Inc.**, 224 N. 22nd St., Philadelphia 2, Pa., as sales engineers to original equipment manufacturers in Delaware, southeastern Pennsylvania, southern New Jersey, and eastern Maryland.

— o —

The L. S. Starrett Co., Athol, Mass., has announced the following personnel changes: **Douglas R. Starrett**, previously assistant vice president, takes over new duties as vice president in

charge of plant operations; **Carl O. Newton**, formerly eastern sales manager, has been named sales manager; **Donald E. Gilbert**, formerly New York branch manager, assumes the duties of eastern sales manager; **Roy M. Peckham**, previously Atlanta representative, has been appointed southern sales manager; **Carl G. Nordmark**, present advertising manager, has been named advertising and sales promotion manager; **Frederick H. Clarkson**, of the advertising department, has been made assistant advertising manager; and **Walter W. Haskins** and **John E. Holcomb** continue as western sales manager and Pacific Coast sales manager, respectively.

— o —

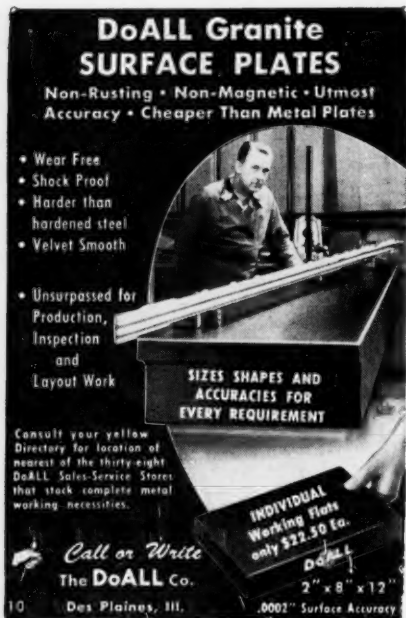
M & N Hydraulic Press Co., Clifton, N. J., has announced the appointment of **Kenneth Y. Ryan** as general manager at its Clifton plant. Mr. Ryan was formerly associated with Brown Instrument Division of Minneapolis Honeywell Regulator Company.

— o —

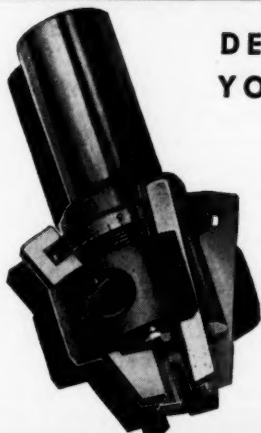
Illinois Tool Works, Chicago, Ill., has announced the appointment of **Robert E. Wolff** as marketing manager of its tool and machine division. Mr. Wolff was formerly assistant marketing manager of the division.

— o —

Raybestos-Manhattan, Inc., Manhattan Rubber Division, has announced three appointments at its Passaic, New Jersey, plant. **C. P. McHugh**, formerly manager of the roll and tank departments, has been named assistant director of research and product design, working with **W. L. White**, director, in Manhattan's laboratories. **S. F. Horesta**, assistant manager of the roll and tank departments, succeeds Mr. McHugh as manager. **E. D. Hines**, sales engineer in the tank department, has been appointed assistant manager.



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Metal-Working News in Brief

Ward Leonard Electric Co., Mount Vernon, N. Y., has announced the appointment of **T. C. Hadden, Jr.**, as purchasing agent. Mr. Hadden was formerly associated with Western Electric Company, Inc., as a buyer.

— o —

E. D. Bullard Co., San Francisco, Calif., has announced the appointment of **Joseph L. Polizoto** as manager of the firm's Los Angeles office located at 6719 South Figueroa Street. Mr. Polizoto has been associated with the company since 1934.

— o —

The appointment of **Robert Von Rotz** as chief engineer has been announced by Tuthill Pump Co., Chicago, Ill. Mr. Von Rotz formerly served as chief engineer with Applied Research & Development Corporation of New York City and Berne, Switzerland.

Ransom Soper, Long Island sales representative of Rudel Machinery Co., Inc., New York, N. Y., died recently at the age of 57 years. Mr. Soper had been associated with the machine tool industry since 1915.

— o —

Harry H. Jason, manager of tool sales, Carboly Department of General Electric Co., Detroit, Mich., has been named manager of Carboly's newly-created New England sales district with headquarters in Wellesley, Massachusetts.

— o —

Dan D. Felske has been appointed vice president in charge of sales over all divisions of The Gear Grinding Machine Company. Mr. Felske's new duties will include the coordination of the sales efforts of the company's grinding service and Geargrind machine divisions, as well as the Rzeppa universal joint division which he formerly directed.

— o —

Gisholt Machine Co., Madison, Wis., has announced the transfer of **Howard C. Foster** to its Clifton, New Jersey, branch office located at 1051 Bloomfield Avenue. Mr. Foster will handle both sales and service work. **Philip E. Denu** will continue as district manager, and **John Leo** will continue as resident service manager.

— o —

Michigan Chrome & Chemical Co., Detroit, Mich., has announced the appointment of **Earl Kunish** to its sales territory comprising Missouri, Iowa, southern Indiana, and southern Illinois. Mr. Kunish will have his headquarters in St. Louis.

— o —

Alfred M. Bakken has been appointed general sales manager in charge of the short-run stamping division of Dayton Rogers Mfg. Co., Minneapolis, Minnesota.

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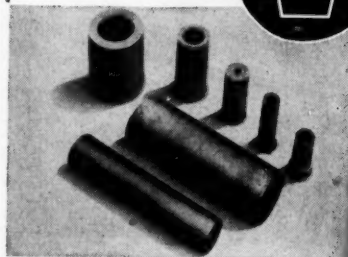
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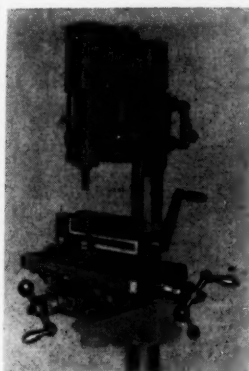


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Formulas for Stress and Strain, Third Edition. By Raymond J. Roark. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N. Y. 381 pages. Cloth binding, board covers. Price, \$7.50.

A working handbook for engineers who are concerned with machine and structural design, this third edition is also excellent as an auxiliary textbook for courses in stress analysis and elasticity. Experimental data and empirical formulas have been revised to bring them in line with the latest available information, and important new material on sheer lag, stress and deflection of circular arches, flat plates with large deflection, pressure vessels and shells, and stress concentration has been added. Tables of coefficients for stress, deflection, and edge slope of flat plates have been enlarged, greatly

facilitating calculations. A few examples have been changed to illustrate new formulas and afford comparison as between computed and experimentally determined stresses. The book features wide coverage, great number and variety of cases, the definite and usable form in which the formulas are given, and convenient and compact tabular arrangement which makes it easy to find the particular case of interest.

For further information on any product mentioned in this issue—use the **READER SERVICE CARDS** opposite page 404.

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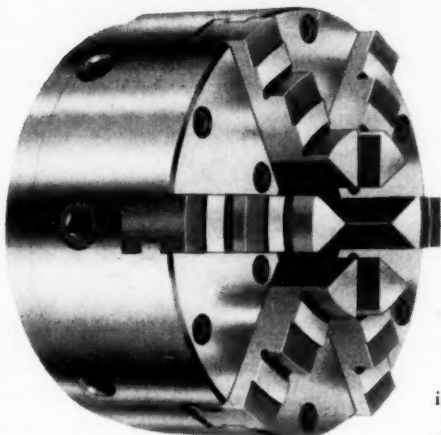
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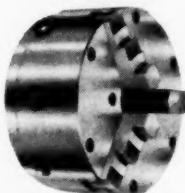
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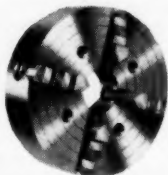
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Sales Stimulants

FACED with dwindling backlogs on the one hand and plenty of productive capacity on the other, builders of machine tools are launching some of the most aggressive selling techniques that the industry has witnessed in many a day. Renewed emphasis is being placed on proven methods of merchandising such as magazine advertising campaigns, sales training courses, replacement formulas designed to weed out obsolete tools, and so on. To these methods might now be added the mobile display coach of Cincinnati Lathe and Tool Company which last month started on a plant-to-plant tour.

It is a well known fact that many plants have had the desire to purchase additional new tools as well as the desire to replace obsolete tools—and would—if they were not frequently stymied by the financing involved. To overcome this obstacle, Kearney & Trecker Corporation has launched a Tool-Lease program which, in effect, will undoubtedly become one of the most influential of all the recently tried sales stimulants.

For years, leasing arrangements have been successfully used by manufacturers of various kinds of processing equipment such as cigarette making machines and business machines of all types. The Kearney & Trecker Tool-Lease program represents the first such program ever conceived on such a broad scale, or with such a bold approach, in the machine tool industry.

The program is designed to release working capital for other purposes such as expansion of merchandising operations, for inventory, receivables and other equipment. It could enable a manufacturer to operate his business on a debt-free status and thus without the restrictions ordinarily demanded by creditors. Limits on future borrowing capacity could be avoided. Risks involved in borrowing could be reduced to a minimum and simplification of the financial structure of a company's operation could result.

The Kearney & Trecker Tool-Lease program offers three plans for rental of its entire line of standard machine tools. Each plan basically is a 7-year lease agreement. They differ in the options permitted. Plan A offers the lessee the right to terminate the lease at the end of the third year or any time thereafter, or to purchase the machine at the end of the third year or any time thereafter, at a specific per cent of the original list price of the machine. Plan B offers the same privileges of termination or purchase, but at the end of the second year. Plan C does so at the end of the first year.

Under Plan A, rental charges are 25 per cent of the list price for each of the first three years. Plan B follows a 30-25-20 per cent graduation in rental for the first three years, and Plan C, a 35-25-15 per cent scale. All three plans call for 10 per cent per year rentals during the last four years of the seven year lease agreement.

Machines on rental basis are held in the name of the manufacturer and rentals are payable semiannually in advance. Under the Tool-Lease program, a manufacturer has the opportunity to see the machine in actual operation before he definitely decides whether or not he wishes to purchase it.

The Kearney & Trecker Tool-Lease program offers industry-at-large a broad approach to the problem of modernization and replacement, while at the same time permits greater latitude in the area of trying, testing and comparing production equipment than might be otherwise considered where outright purchase would be the only alternative.

Much credit is due Francis J. Trecker and other members of his organization for their dynamic approach to the problem of financing machine tool purchases.

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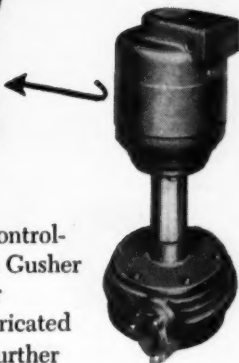
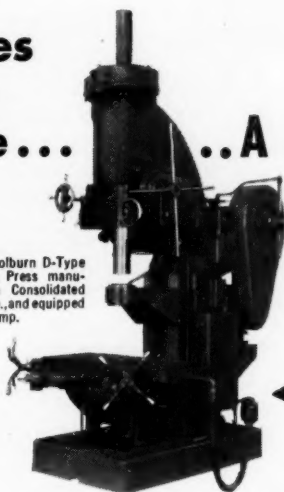
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FIRST

about last operations

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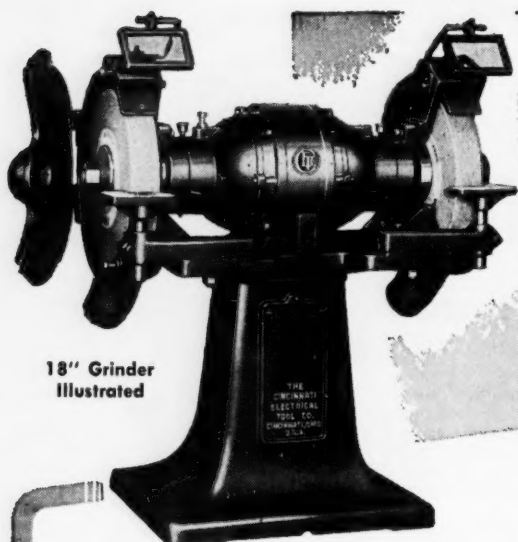
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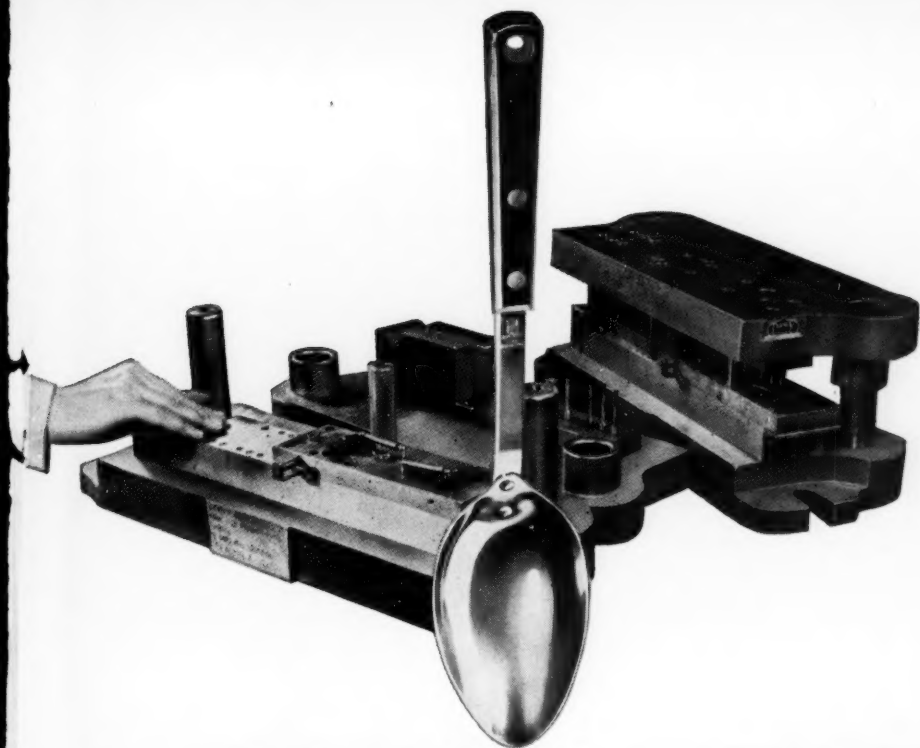
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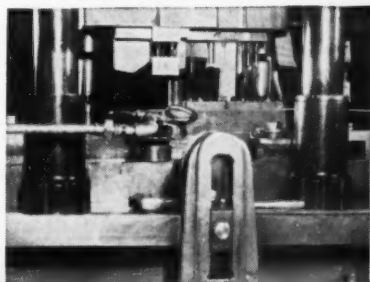
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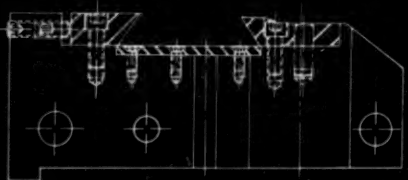
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